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TELEVISION COURSE—INSTALLMENT No. 8

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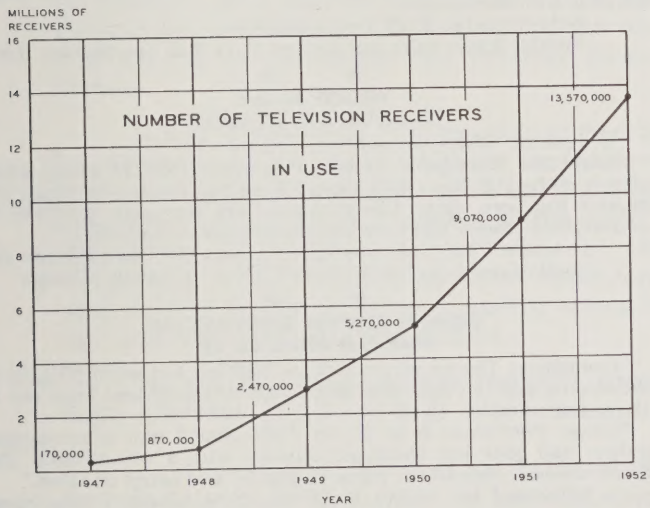
The PHOTOFACT Servicer

SEPT. 1, 1948 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ VOL. 5, No. 45

ROBERT M. ELLIS, *Editor*

TELEVISION GROWS!



According to a recent estimate by Arthur A. Brandt, general sales manager at General Electric's Electronics Park, Syracuse, N. Y., television will serve more than 40,000,000 people in the 140 principal U. S. markets within the next five years. See Servicer Number 46 for important new developments in PHOTOFACT service data for television receivers.

★ ★

MICROGROOVE RECORD EQUIPMENT

It has been a long time since the complacency of the radio industry has been as shattered as it was from the unexpected announcement of the Columbia "LP" (Long Playing) Microgroove Records. Trade rumor has it that other record makers were caught "flat-footed" by this development. Be that as it may, in this case the egg apparently came before the chicken in that these new records appear to have been developed before their players; with the result that there has been a scramble to have suitable turntables, pick-ups, and changers available in time to meet the demand created by the retail availability of the new records.

Information on the new records reached us quite some time ago because of our contacts with the record changer industry and we are glad that we can now tell you about some of the new equipment that is coming on the market.

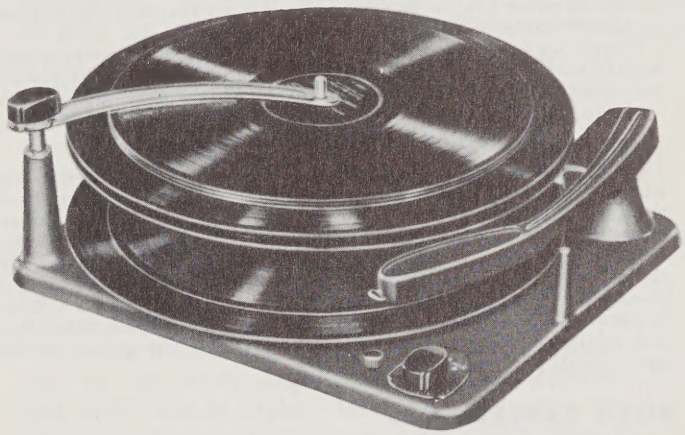
★

V-M DUO-SPEED UNIVERSAL

The new V-M DUO-SPEED UNIVERSAL Record Changers will contain all of the features of their 400 and 800 Series Changers plus a dual speed feature which allows either 33⅓ or 78 r.p.m. records to be played.

The appearance of the standard changers have not been altered except for the addition of two control knobs above the base plate. The dual-speed motor control knob is located adjacent to the regular changer control. The other control added to the changers is the lever on the end of the single tone arm. This lever determines which of the cartridge and needle combinations on the dual-needle reversible cartridge will be in playing position.

Here are some of the major differences between the two types of recordings which necessitate the changes incorporated in this line.

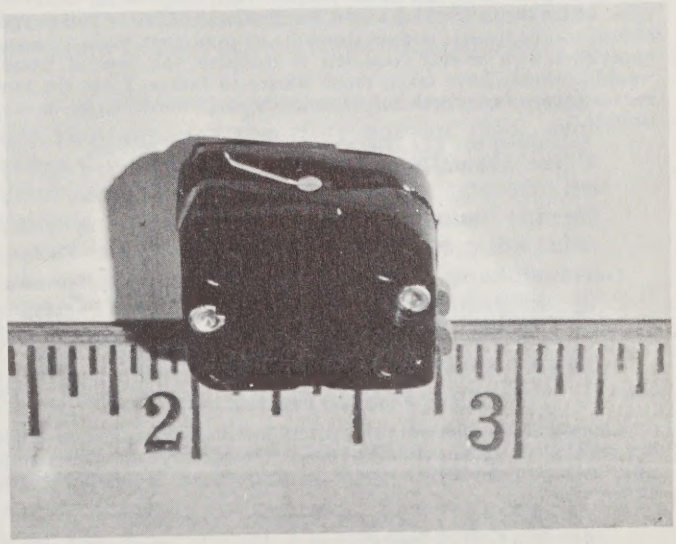


78 R.P.M. Recordings	**33⅓ R.P.M. "LP" Microgroove Recordings**
125 Lines to the Inch	200-300 Lines to the Inch
¾ oz. to 1 oz. Needle Pressure	5 to 8 Grams Needle Pressure
.003 Needle Radius	.001 Needle Radius

The changing of the cartridge control lever position determines the cartridge and needle to be used, and also changes the needle pressure to meet the requirements of the record. When the lever is in the 78 r.p.m. position the changer operates in the standard manner. When the lever is placed in the 33⅓ position and the dual-needle reversible cartridge rotated to the playing position, the needle pressure is changed by a dial cable attached to the cartridge and rigged to the tone arm counterbalance spring. Tension is placed on the spring and it in turn exerts sufficient counterbalancing pressure to reduce the load on the needle to the five to eight grams required for 33⅓ recordings.

★

NEW CRYSTAL CARTRIDGE



There is nothing especially exciting about the crystal cartridge pictured above until its size is compared with the graduations on the

adjacent ruler. Little larger than a dime, this "pee-wee" size crystal cartridge is used on the new Philco Record Players designed for the new "LP" (Long Playing) records.

★

NEW CRESCENT CHANGER

Among the visitors to our laboratory in July, were Messrs. P. G. Andersen and J. Wayne Cargile of Crescent Industries. They brought with them a sample of their new two-speed changer—we hooked it up, tried it in our lab and we admired its performance.

In appearance the new Crescent is quite similar to the standard model, except for the addition of a second light-weight tone-arm and an ingenious speed changing system which allows the turntable to operate at either 33⅓ or 78 r.p.m. We are sorry that as we go to press we do not have a picture to show on this job.

PHOTOFACT Folder coverage will be given on all new record changer models that are placed in quantity production. As a PHOTOFACT subscriber, you will be kept up-to-date on your service information.

★

MICROGROOVE RECORD QUALITY

Our own listening tests on the new L.P. Microgroove record, made with hastily assembled and rather crude equipment, are generally to the good. The quality is excellent, the signal-to-noise ratio is much better than with commercial 78 r.p.m. shellac records; and the dynamic range is such as to make one think an expander was in use. On the other hand, with our own crude equipment, external mechanical shocks of only moderate intensity tended to make the tone-arm skate or jump grooves. Whether the fault is due to the imperfections of our own equipment, or whether it is inherent to the tiny grooves of the new records, time will tell.

★ ★

FIELD EXPERIENCES

Here is your opportunity for passing practical service experiences to others for the benefit of all. For every service "Field Experience" published, we issue to the author a certificate that is good for one PHOTOFACT Folder Set. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or the results which will be obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Company, Inc.

★ ★

CROSLEY 46FA, 46FB
Photofact 475-5, Set 15

"With the help of my Folder I found a stubborn case of trouble very rapidly. A Crosley Model 46FA was brought in which had distorted tone and weak volume. I recently arranged two milliameters on my test panel to read filament and plate current battery type radios simultaneously. When I switched the set on I noticed the plate current about 10 mills instead of the 6 mills as rated in the Folder. I checked the plate voltage and found it down to 65 instead of 87 as rated in the Folder. I quickly traced this effect to the primary of the second IF coil which had about a 50,000 ohm short to the metal rod upon which the coil was mounted. Replacement of the IF transformer cleared up the trouble and returned the set to normal. Without actual experience with several good sets to compare, this case of trouble would probably have taken much longer to isolate. I use the same system as my first check on automobile receivers brought in with trouble."

Submitted by: V. L. Bethea, Bethea Electric Service,
Gibson Avenue, Box 22, McColl, S. C.

★ ★

MAJESTIC 8FM775 (CH. 8BO8D)
Photofact 4719-14, Set 29

"Complaint: No pep on lower B.C. band. The r.f. choke, PHOTOFACT Item 90, in the plate circuit of the 6BA6 was open at one end. Repair and realignment corrected the trouble."

★

FIRESTONE 4-A-30
Photofact Pending

"Complaint: Speaker output was very low on stations; the set would not take an a.f. signal at diode of 6SQ7. The 2.2 megohm screen dropping resistor of the 6SJ7 first audio stage was open. Replace with a ¼ watt resistor."

Submitted by: Mr. Horace Descartes Westbrooks,
Box 281, Griffin, Georgia

PHILCO 46-200
Photofact 461-24, Set 1

"Complaint: Whistles on stations on high frequency end of dial.

"Install .05 mfd. condenser from one side of power line switch to chassis."

Submitted by: Mr. Glenn Chapman, Hal's Radio Electric,
2311-13 So. Salina St., Syracuse 5, New York

★

PHILCO 46-250 CODE 125

"Complaint: Hum, which increases as the volume control is turned up.

"Vibration had worn through the covering of the filter condenser, which was touching the 'number six' pin of the 7C6 socket. This caused hum to be introduced into the AVC circuit.

"Remedy: Wrap some Scotch Drafting Tape around the condenser and reinstall so that it does not touch the 7C6 tube socket. I have had two sets with this trouble."

Submitted by: T. D. Smith, W51XP,
Smith's Radio Sales and Service, P. O. Box 744, Burnet, Texas

★ ★

PHILCO 48-300
Photofact 487-17, Set 37

"Complaint: Distortion and low volume.

"Check the 10 megohm resistor, PHOTOFACT Item 29 in the screen circuit of the 1U5 first audio stage. I have had two sets in which this resistor has been open. The symptoms are the same as would be encountered from a leaky coupling condenser or bad filters."

Submitted by: J. M. Gooch, Serviceman, Reliance Electric and
Radio Company, 210 Whitaker Street, Savannah, Georgia

★ ★

GENERAL ELECTRIC PORTABLE 254
Photofact 482-9, Set 32

"Complaint: The set played O.K. on battery; but when plugged in the electric line the 3Q5 tube would light brightly; and burn out in about ten seconds.

"Cause: PHOTOFACT Item 48, the 1,900 ohm 5 watt center-tapped resistor had gone low resistance. Replace with a new resistor; also check resistors, PHOTOFACT Items 46 and 47 for change of value."

Submitted by: Arthur E. Dibble, New Albany, Pennsylvania

★ ★

RCA 66X1
Photofact 467-23, Set 7

"If the oscillator is dead, check for a short between the primary and the secondary of the short-wave oscillator coil. This short makes the set dead on the broadcast band as well as on the short-wave band."

Submitted by: Mr. Leland Johnson,
513 11th St., No., Benson, Minn.

★ ★

EMERSON 536
Photofact 4711, Set 21

"An Emerson 536 came into the shop with a very persistent hum. On the first check it sounded like filters. An application of the signal tracer to the diode and to the triode grid of the 1S5 showed no hum; but the hum on the triode plate was terrific.

"PHOTOFACT Items 36, 38 and 13 connect to the 1S5 triode plate through vacant prong No. 1 on the 35W4 rectifier tube socket. By removing these connections from this vacant prong, the hum cleared up. The 35W4 socket had carbonized just enough to put considerable hum modulation on the plates of the 1S5, and this hum was amplified by the 50B5."

Submitted by: Mr. Duncan K. Caldwell,
200 Green Street, Sonora, Calif.

PUBLICATION DATES

When will other sets of PHOTOFACT Folders be published?

Volume 5—Set No. 46 ..... **Sept. 15**
Volume 5—Set No. 47 ..... **Oct. 15**
Volume 5—Set No. 48 ..... **Oct. 15**
Volume 5—Set No. 49 ..... **Nov. 15**

If you have been unable to get any issues of PHOTOFACT *Folder Sets, send your order and money directly to us and we will see that you are supplied.*

CHAPTER 3

CATHODE-RAY - - BEAM MODULATION AND SYNCHRONIZATION

Up to this point, we have considered those sections of a television receiver concerned with the formation of an electron beam or "pencil" in a cathode-ray picture tube, the control of this beam in intensity, and its deflection in the horizontal and vertical directions.

It has been shown that the path traced by the beam can be made to cover the picture area in a regular sequence, which corresponds to a similar sequential scanning action occurring in the "pick-up or camera" tube at the transmitter. The methods by which synchronized control of the receiver scanning action is accomplished have been described.

In the following sections we will cover those portions of the receiver which concern:

1. The interception and selection of the desired television signal and its amplification.

2. The detection and separation of the video or "sight" portion of the signal from the accompanying sound signal.

3. The use of the video signal to modulate the intensity of the picture tube electron beam.

4. The reconstruction or insertion of the average or "background light level" (dc restoration).

5. The separation, amplification and use of the sync pulses.

SYNCHRONIZING PULSE SEPARATION, AMPLIFICATION AND UTILIZATION

Sync pulse separation has been mentioned in connection with the description of deflection systems on pages 73 to 84. At this time we will consider in greater detail the methods of separation, amplification and subsequent use of the sync pulses. Before starting such a study, it will be of value to review as a "refresher", some of the fundamental actions and characteristics of vacuum tubes as amplifiers and rectifiers.

REVIEW OF THE ACTION OF VACUUM TUBES AS APPLIED TO THE SEPARATION AND USE OF SYNC PULSES: In analyzing commercial receivers with regard to the method of separating the sync pulses from the "composite" video signal, we find circuits in which this function is accomplished by diodes, triodes and pentodes employed under widely different circuit and operating conditions. These include: diode and inverted diode rectification, triodes and pentodes working at either plate current cut-off or saturation, and "cathode follower" circuits. As an introduction to our study of the individual applications and their use in typical television circuits, the following review of vacuum tube action should be considered together with a study of the characteristic curves and data presented in receiving tube manuals available from the tube manufacturers.

1. The limits of the plate current range of a vacuum tube are determined by cut-off and saturation. Plate current cut-off can be accomplished by a fixed negative grid bias or by negative bias derived from grid circuit rectification of the signal in the case of triodes and pentodes. A series "delay" bias can produce cut-off in the case of diodes. Plate current saturation is produced by operation at low plate voltage in the case of triodes, and at low plate and screen voltages with pentodes.

2. The voltage developed across a cathode resistor, by the plate current flow, provides a negative bias if the grid circuit is returned to the end of the resistor opposite the cathode. A tube biased by its own plate current cannot cut itself off. Self bias from the cathode resistor is often augmented by additional negative bias in series with the grid return or by "bleeding" current through the cathode resistor from the plate supply, to assure operation at or beyond cut-off. (See Figure 91.)

3. A change of the control grid voltage will produce a change of plate current in the same direction or polarity. Stated in another way, the grid voltage and the plate current are in phase with one another.

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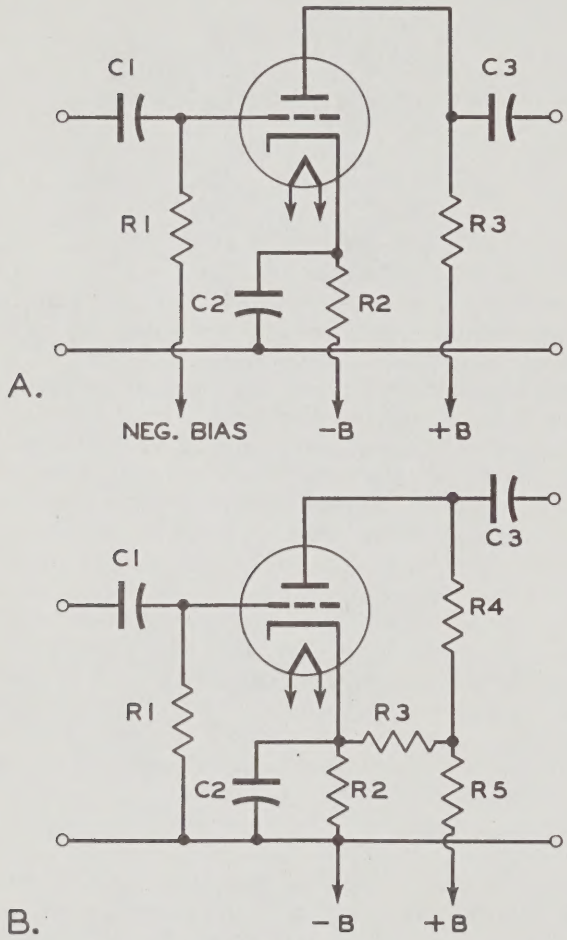


Fig. 91. Cut-off by Combination Bias

4. The plate voltage change caused by a change of grid voltage is in the opposite direction and hence the plate voltage is 180° out of phase with the grid voltage. For this reason, a vacuum tube amplifier is essentially a phase inverter.

5. A drop of plate voltage caused by a positive pulse applied to the grid is known as a "negative going" pulse. As we have seen, such a pulse is required for the control of a cathode-coupled multivibrator.

6. An increase in plate voltage caused by a pulse, which drives the grid more negative than its initial bias condition, is known as a "positive going" pulse. This is the requirement for "tripping" a blocking oscillator.

7. The effect of a plate load resistor is to cause the plate-cathode voltage to decrease with an increase in plate current. Conversely, with such a load, the plate to cathode voltage will increase with a drop in plate current.

8. The amount of change in plate to cathode voltage caused by a change in plate current can be transmitted or transferred to the grid circuit of a following tube, in the same polarity, by means of a coupling capacitor.

9. When the load resistor of a vacuum tube is in the cathode to "B" minus circuit of the tube and the output is taken from the cathode (see Figure 93) the circuit is known as a "cathode follower". Since this type of circuit is frequently employed in television receivers and has not been widely used in broadcast receivers, its action will be described before considering the general subject of sync separation.

THE CATHODE FOLLOWER CIRCUIT: Figure 92 shows a circuit having many interesting characteristics. Its features are: a high input impedance, a low input capacitance, a low output impedance, and an output voltage which "follows" the input voltage and hence is of the same polarity. Although it is a power amplifier, the voltage gain can never reach unity and therefore the loss which it introduces often has to be compensated by additional amplification. These characteristics result from the fact that the unbypassed cathode load resistor (R2) produces inverse or negative feedback to the grid. The action of the circuit is as follows:

1. The plate bypass capacitor (C2) is made sufficiently large that, for the lowest frequency to be encountered, the plate is substantially at ground potential. The cathode resistor (R2) is unbypassed or if a bypass capacitor is used it is made of low value so

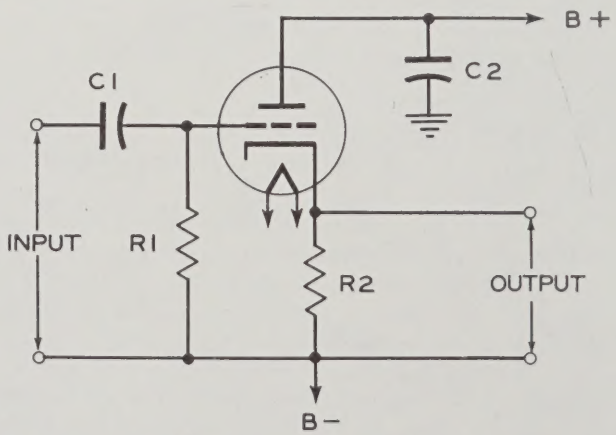


Fig. 92. The Basic Cathode Follower Circuit

that its reactance is high at the highest frequency which the stage is required to pass. The grid is biased negative with respect to cathode by the plate current which flows through the cathode resistor (R2). This automatically establishes an operating point near, but not at, plate current cut-off.

2. Under operating conditions just described, let us examine the results of applying a positive pulse or signal to the grid. The plate current rises, and the increased plate current flowing through R2 causes the cathode to become more positive. If a negative pulse is applied to the grid, the consequent drop in plate current will decrease the voltage drop across R2, and cause the cathode to become less positive with respect to ground. Since the voltage change of the cathode in each case is in the same direction as the grid change which causes it, the cathode "follows" the grid and the circuit is consequently known as a cathode follower.

3. The effective control voltage of the tube, or voltage between grid and cathode, is the difference between the input voltage across R1 and the voltage across the cathode resistor (R2). Thus, the variation of cathode voltage caused by the varying input decreases the effectiveness of the input signal and the stage is said to be "degenerative".

4. This "degeneration" or negative feedback produces the effects of low loading on any circuit across which the stage is connected (high input resistance and low input capacitance). It is interesting to note that the effective input capacitance can be lower than the measured value with the tube cold. To understand how this seemingly impossible condition can occur, let us examine the manner in which the tube and circuit can change the voltage conditions as viewed from the input terminals.

5. Let us assume that when, with a particular tube and plate voltage, a voltage change

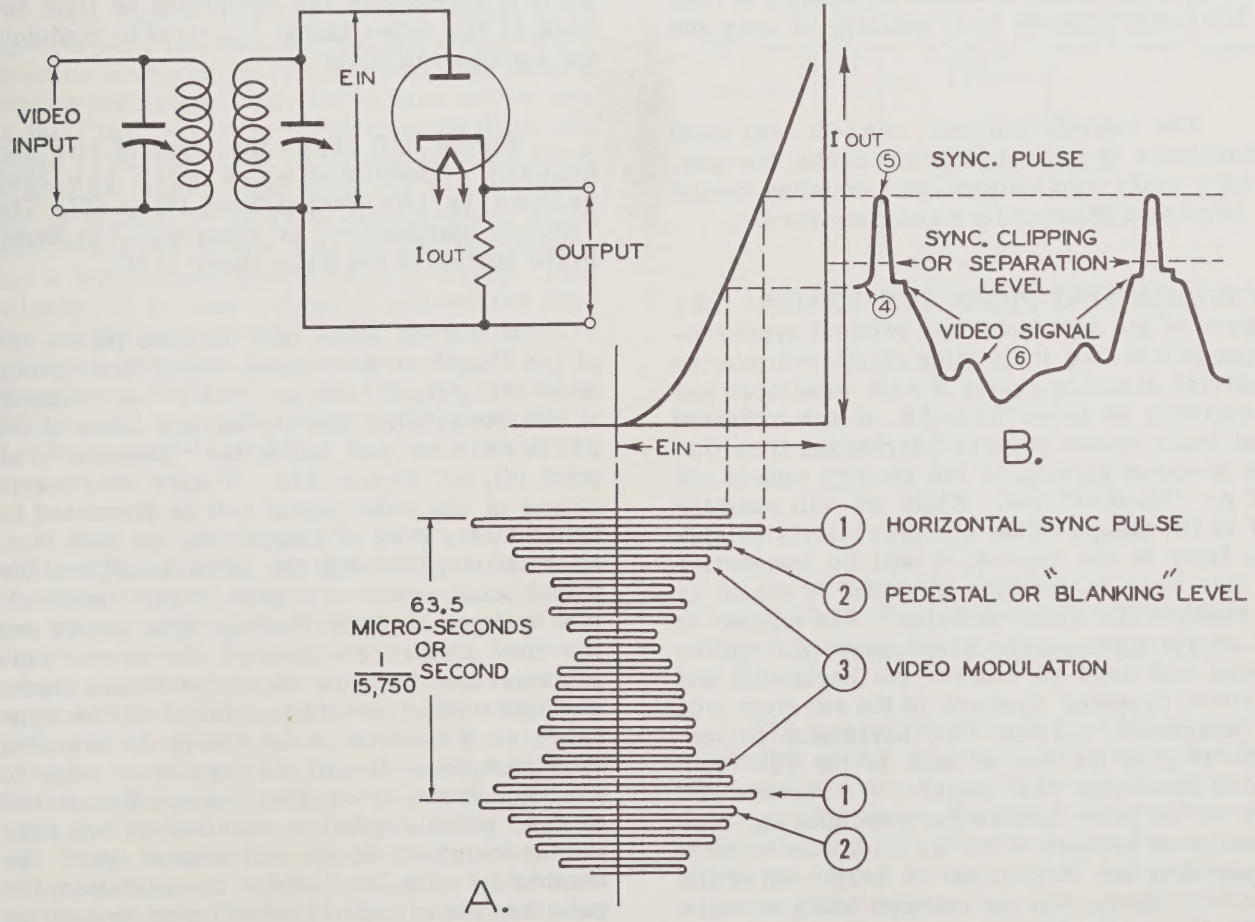


Fig. 93. Demodulation (Detection) of the Video (Picture) Carrier

of 1 volt appears across the input terminals and that this impressed voltage causes a resultant change of cathode to ground voltage of .9 volts. The applied input voltage "attempts" to charge the input capacitance of the tube to a potential of 1 volt. Immediately, there appears a voltage of the same polarity from the cathode on the other "plate" of this capacitor and the resultant charge is .1 volt rather than 1 volt. In this way, the input capacitance of the tube is apparently much lower than its actual "static" value. A similar effect occurs with respect to the input resistance of the tube. In the example used, the effective input capacitance would be only one-tenth of the actual capacitance.

6. In a similar fashion, the effective output impedance of the stage is very low. Its value depends upon the amplification factor and the mutual or transconductance of the tube. As an example, a tube such as the 6J5 with a mu of 20, a plate resistance of 7700 ohms and a G_m (transconductance) of 2600 micro-mhos, will have an effective output impedance across a 1000 ohm cathode load resistor of only 268 ohms.

The cathode follower, which was used extensively in radar equipment during the war, finds many applications as a coupling means in television transmitters and receivers.

SYNCHRONIZING PULSE SEPARATION: The nature of the horizontal and vertical synchronizing pulses and their time relationship to the sawtooth scanning raster were described and illustrated on pages 51 to 53. It was indicated that these pulses occurred during the time that the electron stream in the picture tube is cut off or "blanked" out. While we will examine all of the details of the complex television signal later in the course, it will be instructive at this time to examine the video IF signal as it reaches the video detector. The manner in which the sync pulses are separated from the signal and used to control the horizontal and vertical scanning systems of the receiver will be discussed. Since the horizontal pulses occurring at the end of each of the 525 lines which constitute the picture, are representative of the pulse separation principle, our discussion at present will be confined to their separation and utilization. A treatment of the vertical pulses will be covered when we consider the methods of segregating the vertical from the horizontal pulses.

The pulses can be clipped from the signal in three places in the circuit:

1. At the input of the video or "sight" detector.

2. From any of the video amplifying stages.

3. At the point of restoration of the average background light of the picture. For this reason, Figure 93 shows the nature of the video signal with its picture and synchronizing "information" as it appears at the output of the last video IF amplifier. The video IF carrier at the input of the video second detector, shown in Figure 93 as a diode, is represented at point "A". It will be seen to consist of horizontal pulses (as detailed in Figure 65) mounted on a "shelf" or "pedestal" These are identified in Figure 93 as (1), the pulse, and (2), the pedestal. Between the edges of the pedestals is found the modulated envelope of the carrier which represents the variations of light and dark of the video signal (3), used to modulate the cathode ray beam.

Figure 93B shows the form of the detected or demodulated wave with the sync pulses in the region from (4) to (5). The "picture information" or video signal is shown in the portion of the wave shown at (6).

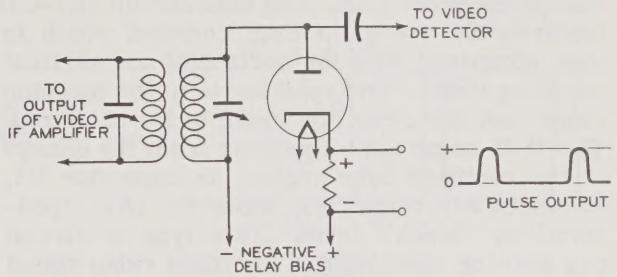
It will be noted that the sync pulses are at the "top" of the signal. Since these occur when the picture tube is "black" or blanked, it will be evident that the darker tones of the picture are just below the "pedestal", or point (4), of Figure 93B. While the exact nature of the video signal will be discussed in detail later, it is of importance to note that, after passing through the video amplifier, the signal must reach the grid of the "picture" tube in such a phase that the sync pulses are the most negative part of the wave. This accomplishes blanking during the return trace. We have seen that the polarity of the sync pulse, as it arrives at the grid of the scanning oscillator, must be of the proper sign to assure control. For this reason, the method of sync pulse separation selected in any particular receiver design will depend upon: the number of stages of video amplification, the point in the circuit at which sync separation is accomplished, and the number of sync amplifier or clipping stages employed.

All of the methods of separating the synchronizing pulse from the rest of the video signal, involve the fact that the "pedestal" or blanking level is always maintained in transmission, at a definite point on the carrier wave (75% of maximum carrier) and therefore the sync pulses occupy the top 25% of the wave. The problem of sync clipping thus resolves itself into one of "amplitude separation" or of removing the top 25% of the wave without passing the lower values which contain the video signal. The methods commonly employed will be covered under headings of the types of tubes used.

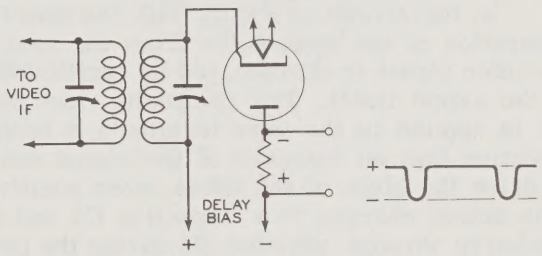
DIODE SYNC SEPARATION CIRCUITS. Figure 94 shows the commonly used diode sync separation circuits. The first three of these (A, B and C) involve the "clipping" of the pulse by rectification of the video IF carrier. In each case, the diode will be found connected across the video detector circuit. The video detectors have been omitted for simplicity.

In Figure 94A the picture signal is of positive polarity, meaning that the output of the detector becomes more positive as the picture carrier increases. Since the sync pulses are at the "top" of the carrier modulation, the output from the diode separator is in the form of positive pulses. One stage, or any odd number of stages, of video amplification, which will invert the phase, will be required following a detector and separator of this type. This polarity of the video signal is correct for control of the picture tube grid, since a negative voltage is required for beam cut-off. The negative bias shown in series with the circuit of Figure 94A biases the diode to the "pedestal". Anode current flows for the duration of the sync pulses only.

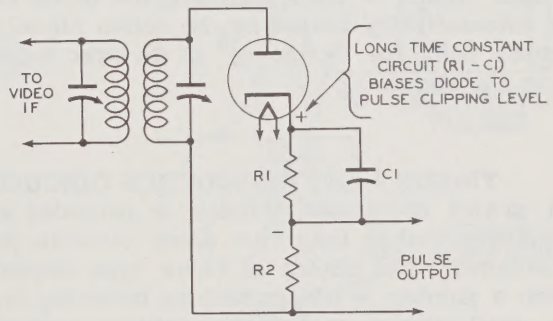
Figure 94B shows an "inverted" version of the same circuit. In this case, an increase of video carrier causes a more negative output voltage. The pulse output is negative and the video output of the detector diode, connected across the separator, is in the correct direction to actuate the picture tube grid. For this reason, an even number of video stages must be employed, causing the output to be of the same phase as the input. As in the preceding case (Figure 94A), a delay bias is employed. Diode rectification is limited to the level of the sync pulses and the rest of the video signal is rejected. The bias in this case, however, is positive with respect to ground or chassis.



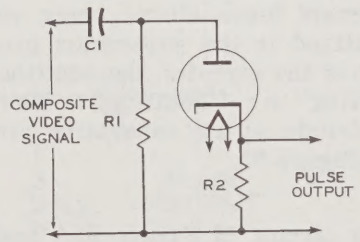
A. POSITIVE PICTURE POLARITY—POSITIVE PULSES.



B. NEGATIVE PICTURE POLARITY—NEGATIVE PULSES.



C. CATHODE BIAS WITH SERIES LOAD.



D. RECTIFIED SIGNAL BIAS WITH CATHODE LOAD.

Fig. 94. Diode Sync Separation Circuits

The operation of the circuit (Figure 94C) is similar to that of Figure 94A except that the bias required for delay of the diode action to the correct point is derived from rectification of the signal itself. Two load circuits are employed in series as the cathode return circuit. A bias voltage appears across one of these (R1 -C1), and the output sync pulse is developed

across the other (R2). The bias circuit (R1-C1) features the use of a time constant which is long compared with the horizontal and vertical scanning times. The resistor is in the megohm range and the capacitor in the order of .5 mfd. The D-C component resulting from the charge of the rectified sync pulses, in capacitor C1, automatically biases the diode to the "pedestal" or "black" level. This type of circuit can also be used with a rectified video signal as well as with video carrier input as shown.

In the circuit of Figure 94D, the bias for separation of the sync pulse from the rest of the video signal is also derived by rectification of the signal itself. The composite video signal is applied to the input terminals in such a direction that an increase of the signal tends to drive the plate of the diode more positive. This action charges the capacitor C1 and its discharge through resistor R1 during the period between pulses establishes a negative voltage drop with respect to the plate. With proper choice of time constant, the diode can be automatically biased by the video signal to proper point for "clipping" of the sync pulses from the signal.

TRIODE SYNC SEPARATION CIRCUITS. In many receivers, triodes or pentodes are employed rather than the diode circuits just discussed. The choice of tube type depends upon a number of design factors involving type of sync control, polarity requirement, and point in the circuit at which separation is accomplished. In general, the use of these multi-element tubes allows some voltage gain to be realized in the separation process and, in certain of the circuits, the additional feature of "leveling" or "limiting". Three basic types of triode sync separating circuits are shown in Figure 95.

The circuit of Figure 95A makes use of grid rectification of the video signal, to bias the control grid, so that cut-off of the plate current occurs at the desired pedestal level. This action is similar to that just discussed for the diode circuit of Figure 94D. Two additional actions are found in this circuit:

1. The sync pulses are sufficiently high in magnitude to drive the grid into the positive region and the lowered grid resistance limits the input signal by loading.

2. Some amplification of the sync pulse occurs due to the amplifying properties of the triode.

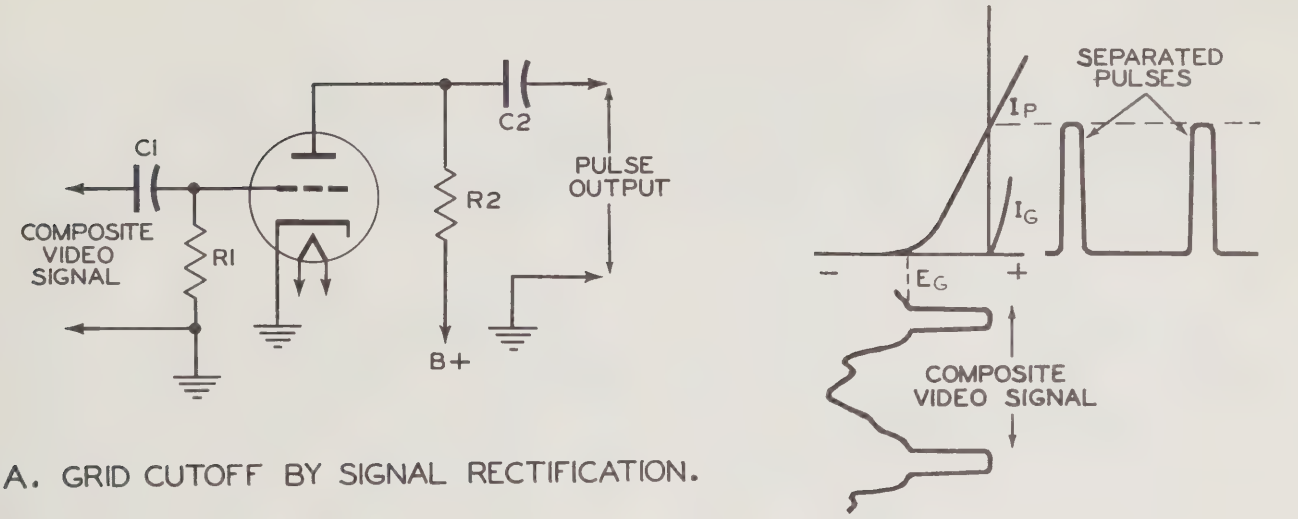
In the arrangement shown in Figure 95B, the operating conditions are quite different from those of the circuit of Figure 95A. The tube is biased from an external source of voltage, through resistors R1 and R2, to such a point that it is just starting to draw grid current at the "black" or pedestal level. The input signal is inverted in polarity from that of the preceding example. In this case, the sync pulse portion of the video input signal is the most negative region. The plate voltage is made very low so that saturation of the plate current occurs at a grid voltage close to its zero value. The portion of the video input signal, more positive than the desired "clipping" level, lies in the saturation region and produces no further rise in plate current. For this reason, "limiting" or "leveling" occurs at this saturation point. The negative excursions of grid voltage, caused by the sync pulse portion of the input signal, cause a drop in plate current as shown in the wave form drawings of Figure 95B. Although the amplitude of the sync input pulses has been limited in the drawing (in order to better illustrate the circuit action), it is evident that if their amplitude is extended to beyond the grid cut-off point, limiting will also occur due to plate current cut-off and the output pulses will be uniform in size.

The series resistor in the grid circuit (R1) limits the amount of grid current which can flow over any one frame. This prevents a long-time blocking condition from developing due to an excessive charge on capacitor C1.

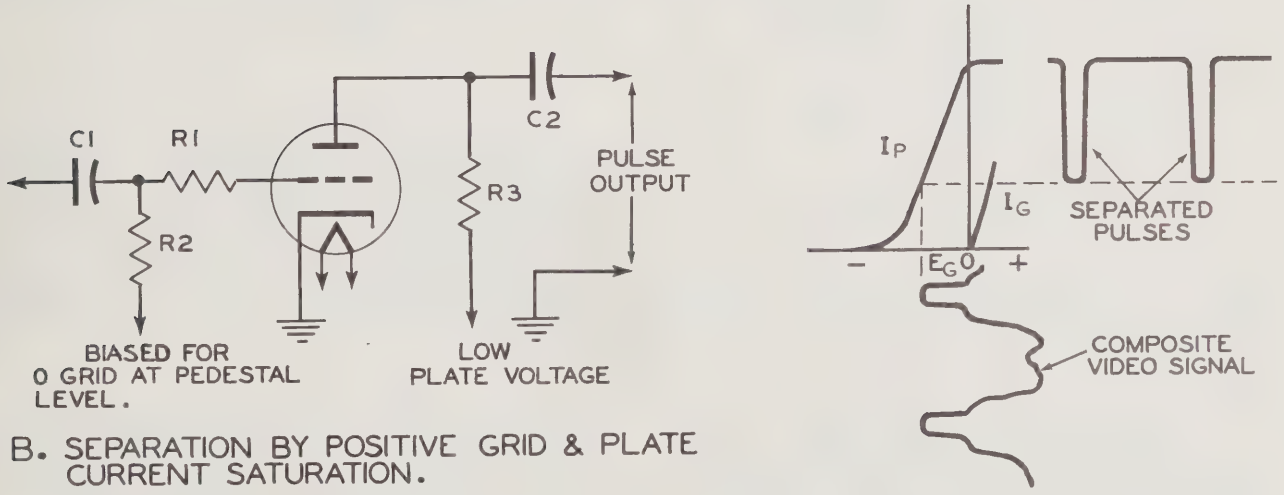
The circuit of Figure 95C employs cathode bias to establish the correct operating point for plate circuit separation of the sync pulses. In this case, the values chosen for resistor R2 and capacitor C2 are determined by the following considerations:

1. The resistor must have such a value that the plate current pulses above the "clipping" level will produce a voltage-drop equal to the required operating point. For high-mu tubes, this resistor will be in the order of 10,000 ohms.

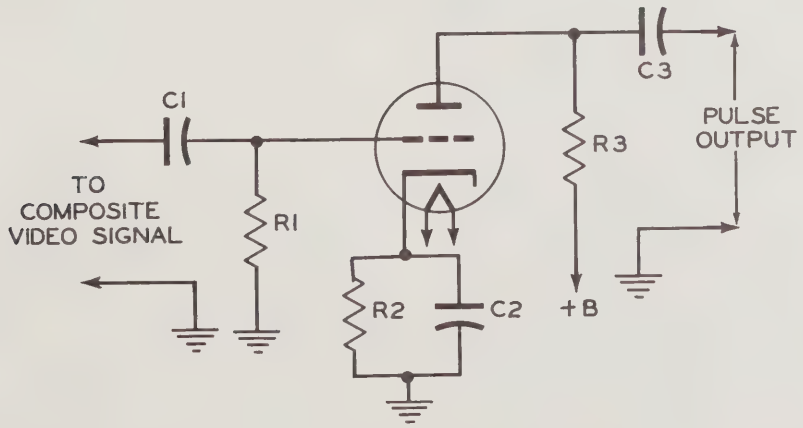
2. The value of the capacitance C2 must be a compromise between several factors. It



A. GRID CUTOFF BY SIGNAL RECTIFICATION.



B. SEPARATION BY POSITIVE GRID & PLATE CURRENT SATURATION.



C. CATHODE BIAS CIRCUIT.

Fig. 95. Triode Sync Separation Circuits

must be high enough to maintain constant bias voltage throughout at least one vertical blanking period and yet low enough in value that it can change its charge in accordance with changes of the average background lighting of the scene.

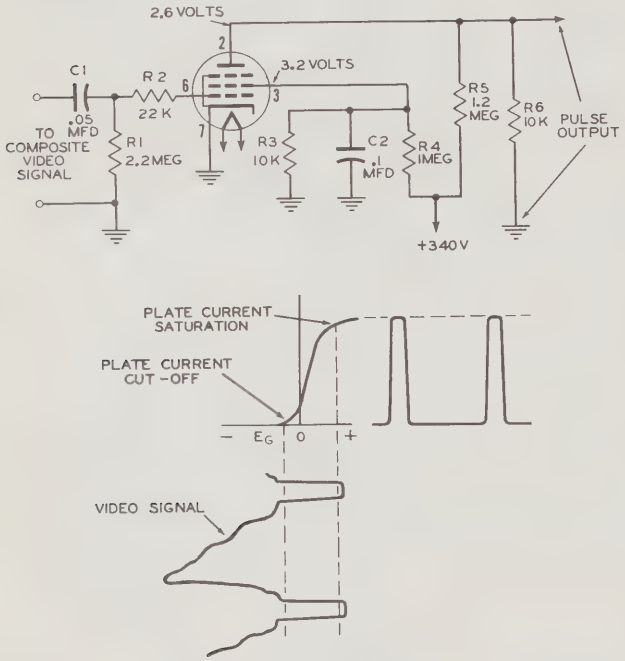


Fig. 96. Pentode Sync Separating Circuit Incorporating "Leveling" or "Limiting"

PENTODE SYNC SEPARATION. Figure 96 illustrates the use of a sharp cut-off pentode as a combination sync separator and limiting amplifier. Plate current saturation is assured by operating both the screen and plate at extremely low voltages. This is accomplished by the use of dividing networks. The screen network consists of resistors R3 and R4 and it will be seen that with a "B" supply voltage of 340 volts, the screen is held at the extremely low voltage of 3.2 volts. In like manner, the plate supply network consisting of resistors R5 and R6 maintains the plate at 2.6 volts. Under these conditions, plate current saturation occurs just after the grid voltage has passed into the positive region as shown in the diagram of Figure 96. The grid circuit network, consisting of resistors R2 and R1 with capacitor C1 establishes the operating point of the circuit by grid circuit rectification of the video signal. This assures plate current cut-off at a level just above the "pedestal" or "black" region. It will be seen from the drawings that the synchronizing pulses are clipped at both ends and leveling or limiting occurs. Since a pentode operating under these conditions exhibits very low voltage gain, it is necessary to operate a circuit of this type either at a high voltage level point in the system or to follow it with sync amplifiers.

The series grid resistor (R2) in this circuit functions in a manner similar to that of the positive grid triode of Figure 95B. In this case, however, it serves an additional function. Sharp noise pulses, such as those due to motor car ignition, whose amplitude might be higher than the sync pulses in the absence of this resistor would drive the grid highly positive and result in a blocking condition. This would cause loss of synchronization, during the period that the tube was blocked, resulting in loss of grid and plate current which can flow during any one sync or noise pulse.

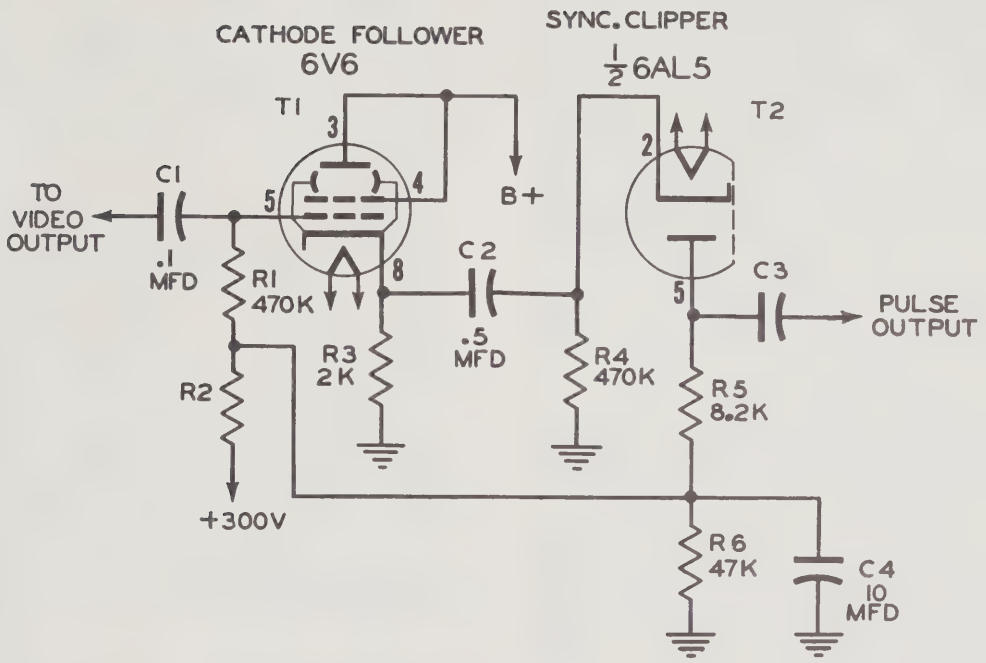
CATHODE FOLLOWER SYNC SEPARATION CIRCUITS. Figure 97 shows two circuits which employ the cathode follower principle for the separation of synchronizing pulses from the video signal. In both cases the action is at high voltage level and the input to the cathode follower is taken from the final stage of the video amplifier.

Figure 97A shows a 6V6 output pentode operating as a high transconductance triode with screen and plate connected together. This tube, in turn, feeds a diode acting as a sync clipper in a manner similar to that described in connection with Figure 94B.

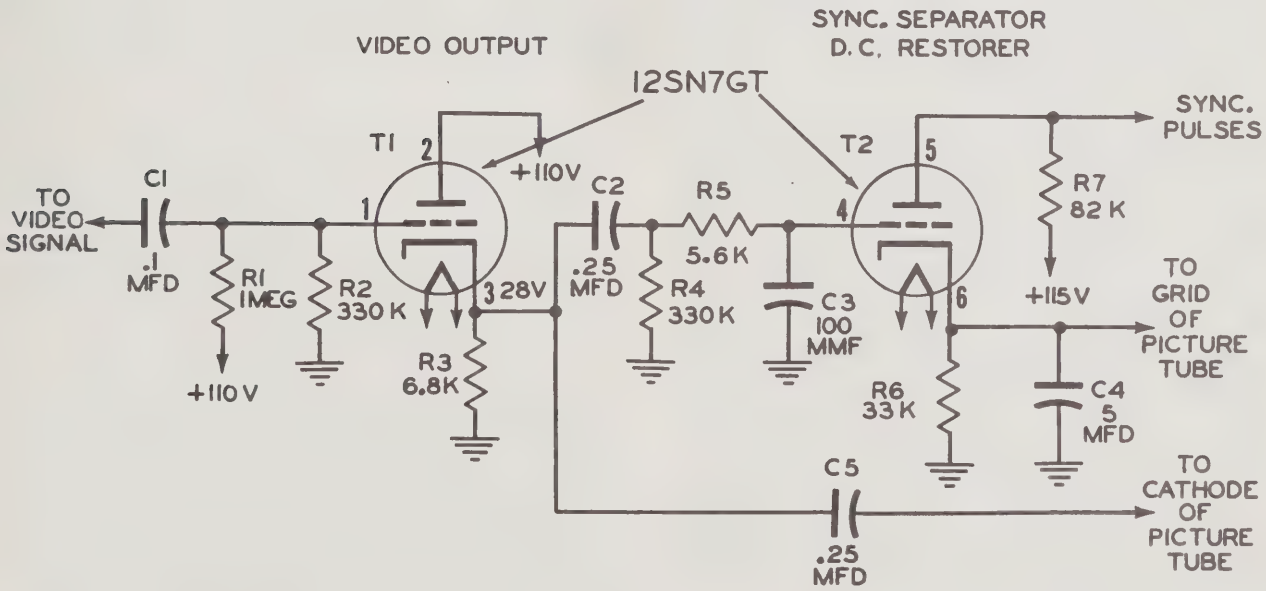
Several unusual circuit features are evident:

1. The grid circuit of the cathode follower is returned to plus 300 volts through the network consisting of R1, R2 and R6. If the diode (T2) were to be removed from its socket so that no plate current could flow through R6, the grid of tube T1 would be at a positive potential.

2. The circuit consisting of resistor R6 and capacitor C4 is charged by the rectified sync pulses from tube T2. The values chosen for the components of this circuit produce a long time constant. A steady bias voltage, negative to ground, appears across R6.



(A) CATHODE FOLLOWER — SYNC CLIPPER CIRCUIT



(B) CATHODE FOLLOWER WITH TRIODE SEPARATOR

Fig. 97. Cathode Follower Sync Separation Circuits

3. This bias voltage is introduced into the grid circuit at the tap between resistors R1 and R2 and opposes the positive voltage from the plate circuit.

4. Plate current of the cathode follower itself flowing through resistor R3 produces another source of bias voltage which also tends to oppose the original positive bias.

5. The combination of this group of voltages produces a condition whereby the grid of the cathode follower is slightly negative with respect to its own cathode and operation of the tube is on the linear portion of the characteristic curve. This operation tends to become automatic since that portion of the bias which is contributed by circuit R6-C4 is dependent upon the peak level of the synchronizing pulses.

6. The pulse output for control of scanning is taken across the un-bypassed resistor R5 in the plate of the diode sync clipper tube (T2).

The circuit of Figure 97B is similar in some respects to that just described since operation of the cathode follower tube (T1) occurs on a linear portion of the curve due to the balance of the bias developed across resistor R3 and the voltage from the plate circuit produced by the network R1 and R2. In this case, a net negative voltage of minus 2 volts appears between grid and cathode.

The cathode follower tube (T1) performs the dual functions of video output and sync take-off. The video output for the cathode of the picture tube is taken directly from the cathode load resistor (R3) through capacitor C5.

This same load resistor feeds a triode (sync separator and D-C restorer) tube T2, through the network consisting of C2, R4, R5, and C3. The combination of R5 and C3 constitutes a filter for the removal of the high frequency components of the video signal.

Sync pulses are taken from the plate of triode T2, which operates in a manner similar to that of Figure 95C. Use is made of the direct current bias voltage existing across network R6-C4 to restore the average component of the picture signal which is responsible for the average light of the televised scene. This D-C component of the signal has been lost in passing through the video amplifier stages. A more detailed explanation of D-C restoration will be given later in this course.

SYNC PULSE AMPLIFICATION. CLIPPING AND SHAPING. In most television receiver designs, more stages than a one tube circuit are employed for the separation of the sync pulses from the video signal. These additional stages are introduced for the purpose of: inverting the phase of the pulses (when not of the proper polarity for control of the scanning oscillator), clipping the pulse width (for more reliable control of scanning), amplifying the pulse (if it is not of sufficient strength for control), leveling the pulse (to take care of variations of the video signal and minimize the effect of interfering noise pulses).

There appears to have been little standardization to date in naming these stages, and we find the following descriptive titles in the service literature of the various manufacturers: "sync clipper", "pulse stripper", "sync amplifier", "sync inverter", "sync leveler", "sync limiter", "pulse limiter" and "clamper". These various actions are self-explanatory and have been covered in the preceding text. It should be noted that even though a stage is labeled as a "sync amplifier", it is usually biased in such a manner that either cut-off or saturation contributes some element of "leveling" or "clipping" as well as the desired voltage amplification.

Examples of the application of these stages in typical commercial receiver designs will be found in the circuits covered under "Typical Commercial Deflection Systems" of Chapter 2 and in the samples of "Typical Synchronizing Systems" at the end of this section.

"SORTING" OF THE INDIVIDUAL HORIZONTAL AND VERTICAL PULSES. In the foregoing description of the various methods of separating the synchronizing pulses from the composite video signal, only the narrow horizontal pulses were mentioned. The longer vertical pulses are clipped from the signal in the same separation process.

After these sync pulses have been removed from the video signal, by any one of the methods described, it is then necessary to "sort" the vertical from the horizontal and feed each pulse to its respective deflection scanning systems. Since the horizontal and vertical pulses are equal in amplitude or height, the methods of separation which were described for clipping them from the video signal cannot be used to distinguish between them. They do, however, differ in time duration and it is on this basis that the "sorting" is accomplished.

Several times, in the description of deflection systems, mention has been made of "differentiating" networks for the removal of horizontal pulses and "integrating" networks

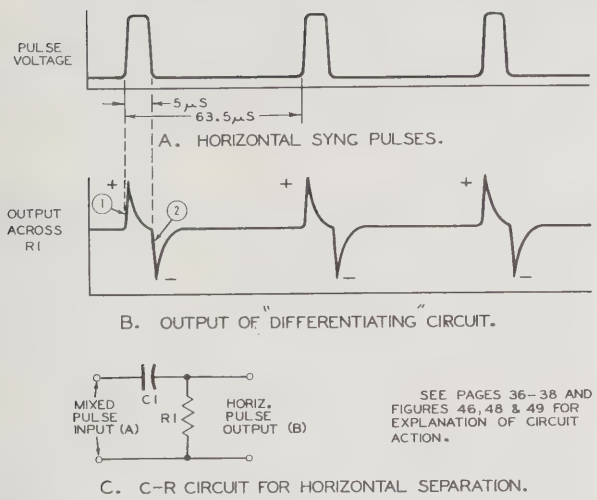


Fig. 98. Horizontal pulse separation or "Differentiation"

for the vertical pulse acceptance. At this time, we will consider the action of such systems in greater detail.

HORIZONTAL PULSE SEPARATION. The horizontal pulses of the transmitted signal are approximately five microseconds in "width" or duration as shown in Figure 65. These pulses are impressed on a circuit of the type shown in Figure 98, which is known as a "differentiating" R-C circuit.

The term "differentiation" is a mathematical expression used in calculus and means simply the "breaking down" of a quantity into a number of small parts. In this case, the pulses of Figure 98A are "made into" smaller parts as shown in Figure 98B by the action of the circuit shown in 98C.

The circuit consists of a capacitance and resistance combination in which the capacitance is in series with the separated pulse input, and the resistor is in "shunt" across the output. The time constant of this circuit is made short compared with the duration of a horizontal sync pulse. The sync pulse is held between 4 and 5 microseconds in time duration and the time constant of the horizontal differentiating circuit is made between 1 and 2 microseconds. As described on pages 37 and 38 and illustrated in Figure 49, for a C-R circuit in which the time constant is short compared with the duration of the applied square wave pulse, the capacitor is completely discharged. A sharp "pip" of voltage occurs across the resistor at both the leading and trailing edges of the applied square wave pulse.

The amplitude of the "pip" is determined by the "steepness" of the edge of the square wave and, for this reason, limits are placed by the Federal Communication Commission on the allowable slope of the leading and trailing edges. These slopes must not occupy more than 5 percent of the horizontal line scanning interval of 63.5 microseconds.

The voltage "pip" due to the leading edge of the horizontal synchronizing square wave, is shown as a positive "pip" at (1) of Figure 98 and the "pip" due to the trailing edge of the horizontal pulse is shown as a negative voltage at (2) of Figure 98. The leading edge pulses are the ones which are employed for control of the horizontal scanning oscillator and the negative pulses are rejected by cut-off or saturation of one or more stages of the sync system.

When the longer duration vertical synchronizing pulses arrive, the action of the differentiating circuit becomes that shown in Figure 99. Here again, a positive "pip" occurs at the leading edge of each vertical pulse and a negative "pip" at the trailing edge. The leading edge pulses continue to control the horizontal oscillator during the time of vertical retrace. In this instance, however, two pulses occur during a horizontal line-scanning interval. Only the first of these is used to control the horizontal oscillator. The second cannot cause lock-in since it happens at a time in the sawtooth wave when the amplitude is insufficient to trip the oscillator.

The horizontal pulses can be separated from the complex video signal by means other than the C-R "differentiating" circuit just described. Figure 100 shows two types of differentiating circuits which employ inductance, and a third type which uses the properties of a resonant circuit.

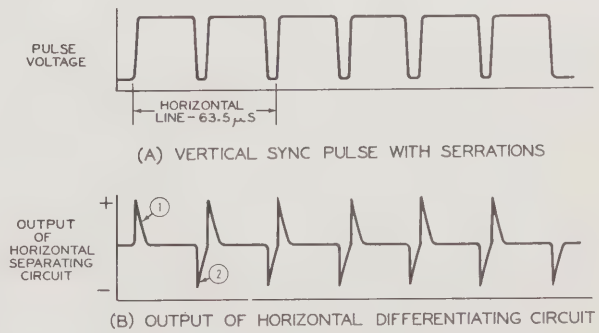

PULSE VOLTAGE
HORIZONTAL LINE - 63.5 μS
(A) VERTICAL SYNC PULSE WITH SERRATIONS
OUTPUT OF HORIZONTAL SEPARATING CIRCUIT
(B) OUTPUT OF HORIZONTAL DIFFERENTIATING CIRCUIT

Fig. 99. Action of Vertical Sync Signal on Horizontal Differentiating Circuit

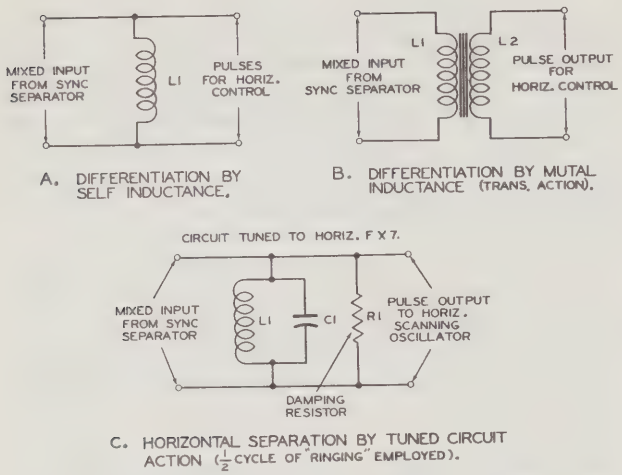

MIXED INPUT FROM SYNC SEPARATOR
L1
PULSES FOR HORIZ. CONTROL
A. DIFFERENTIATION BY SELF INDUCTANCE.
L1
L2
MIXED INPUT FROM SYNC SEPARATOR
PULSE OUTPUT FOR HORIZ. CONTROL
B. DIFFERENTIATION BY MUTAL INDUCTANCE (TRANS. ACTION).
CIRCUIT TUNED TO HORIZ. F X 7.
MIXED INPUT FROM SYNC SEPARATOR
L1
C1
R1
PULSE OUTPUT TO HORIZ. SCANNING OSCILLATOR
DAMPING RESISTOR
C. HORIZONTAL SEPARATION BY TUNED CIRCUIT ACTION (½ CYCLE OF "RINGING" EMPLOYED).

Fig. 100. Other Methods of Horizontal Sync Pulse Separation

The inductance of Figure 100A is connected in series with the plate circuit of a tube which has been biased to clip the sync pulses from the video signal. The waveform of the sync-pulse plate current consists of steep slopes, which correspond to very rapid changes of current. The voltage which appears across the inductance is proportional to the rate of change of the current through it. Thus, at the leading and trailing edges of each plate current pulse, a high voltage is produced across the inductor of the same form as shown for the C-R type of differentiator (Figure 98B). If the pulses are of proper polarity and sufficient amplitude, they may be applied directly to the scanning generator by a capacitor connected to the plate end of the inductor. In case the polarity is incorrect, phase reversal may be accomplished by an amplifier stage or by transformer action as shown in Figure 100B. When a transformer is used, the secondary L2 has induced voltage pulses of opposite polarity to those occurring across the primary L1. The secondary can be connected directly to the horizontal scanning generator grid circuit.

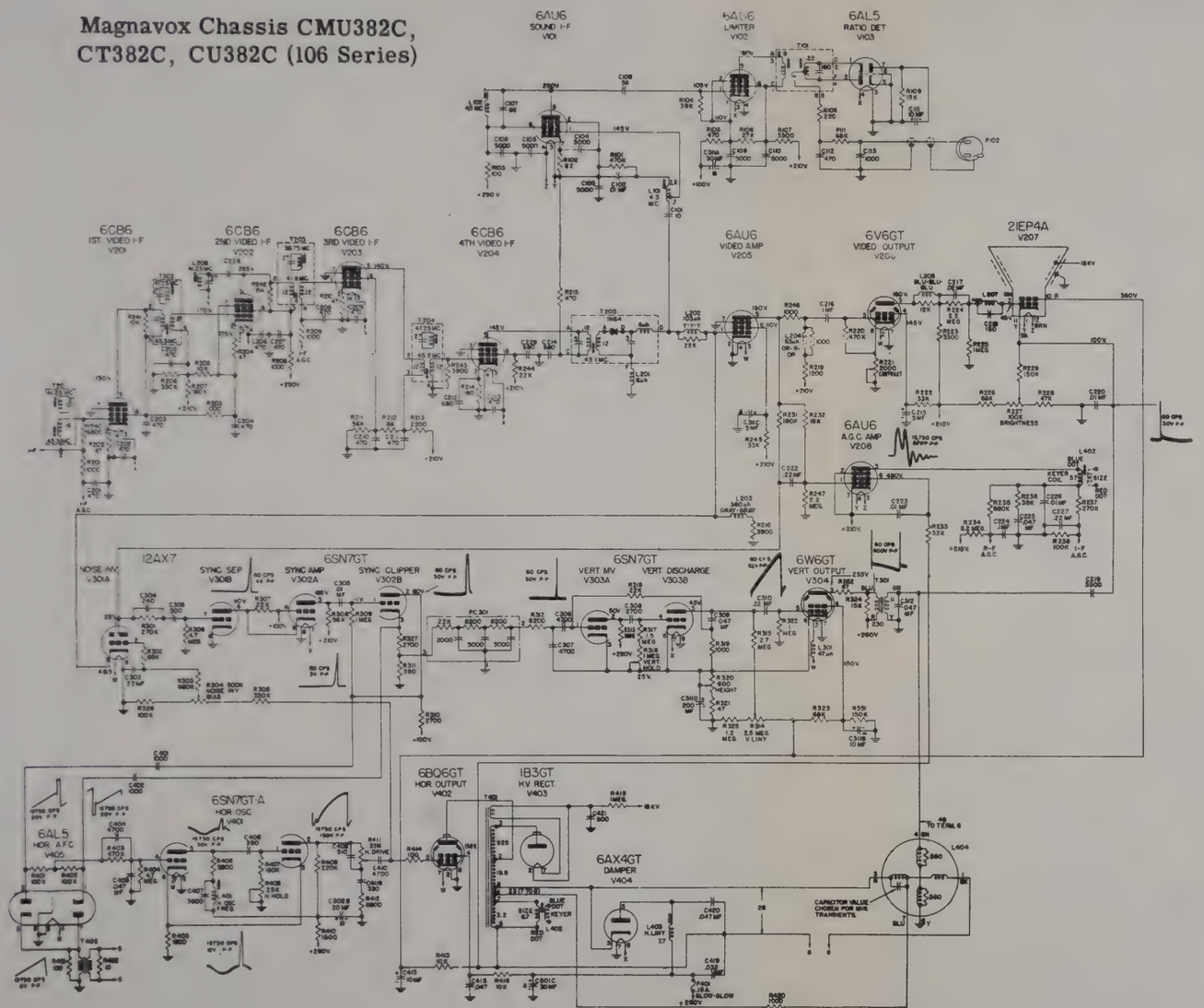
The circuit shown in Figure 100C operates quite differently from the two just described. The resonant circuit consisting of L1 and C1 is tuned to approximately seven times the horizontal line frequency of 15,750 cycles (110 kilocycles). The separated sync-pulses are impressed across the circuit and "shock excite" it into oscillation at its resonant frequency. The oscillation is quickly damped out by the parallel resistor R1. Only the first half cycle of voltage across the circuit is used for control of the horizontal scanning oscillator. This corresponds to a pulse duration of approximately 5 microseconds. Several advantages can be cited for this method of horizontal sync discrimination:

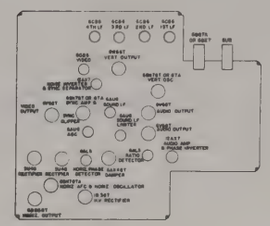
1. It allows the design of an extremely simple pulse separation and oscillator control system. The circuit can be connected directly in the plate return of the sync separator tube and can be coupled directly to the scanning oscillator because the function of pulse shaping is performed by the resonant action.

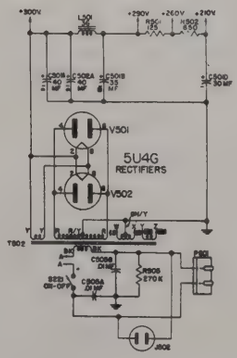
2. It is relatively immune to excitation by static or ignition noise because such pulses would have to be of the proper time duration (5 microseconds long) and of the proper repetition rate (15,750 cycles) to produce the "ringing" action. The probability of such coincidence in random noise excitation is slight. A typical example of the use of this circuit in a commercial design will be found at the end of the sync pulse separation section.

Installment 9 will continue the study of sync separation and utilization.

Magnavox Chassis CMU382C, CT382C, CU382C (106 Series)







Schematic Diagram Courtesy of Magnavox Co.

The PHOTOFACT Servicer

Vol. 32 ★ Published for all users of Howard W. Sams' Photofact Folders ★ July 1, 1956
Nos. 323 & 324

The service information in this Servicer provides data on models which we have been unable to present in PHOTOFACT Folders. The receivers are not in current production; a requirement for PHOTOFACT coverage, and we are therefore presenting schematics and supplementary data that will be of assistance when servicing these models.

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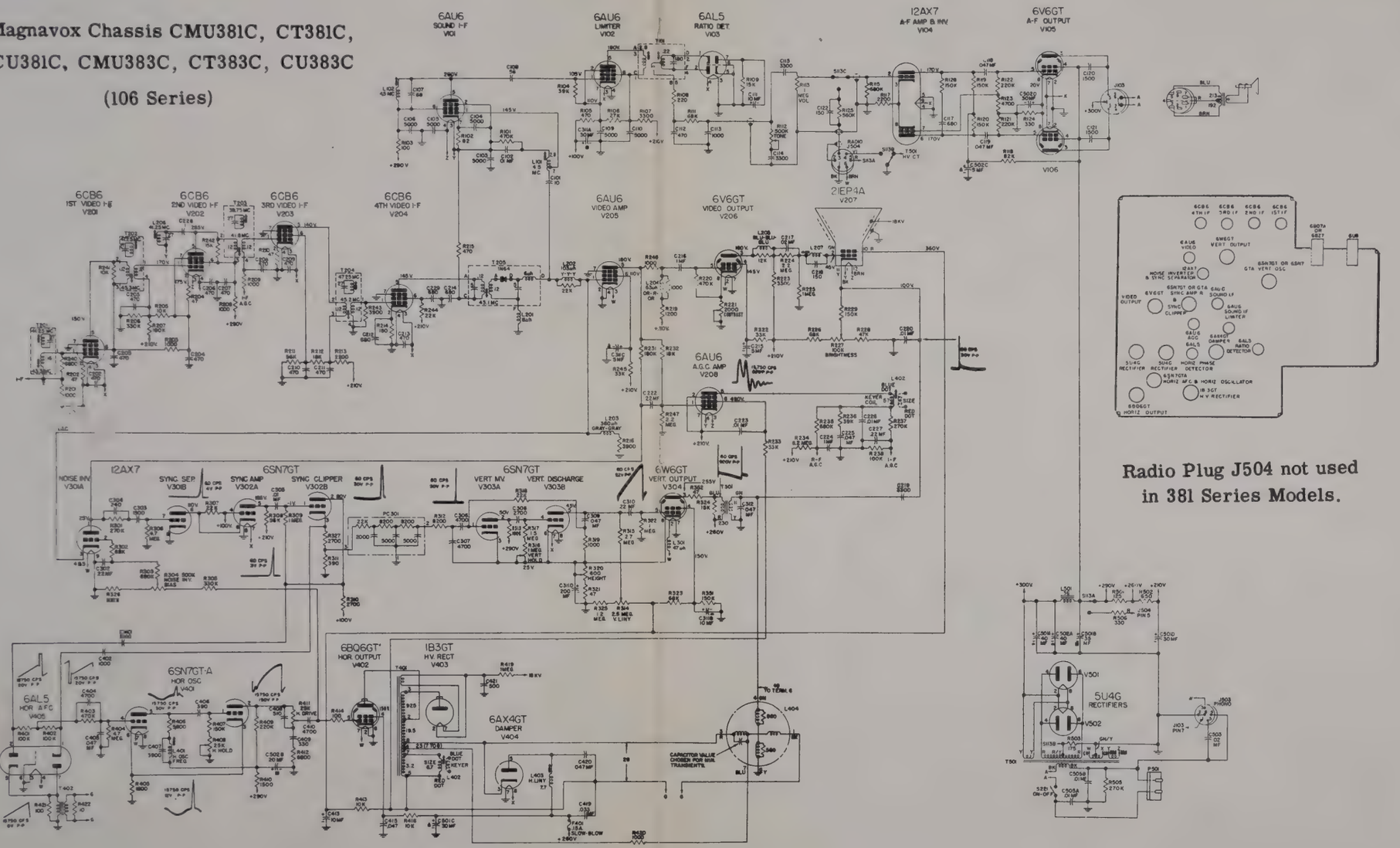
3324 MIRADE ST.
DENVER, COLORADO

Magnavox Chassis CMU381C, CT381C, CU381C, CMU383C, CT383C, CU383C

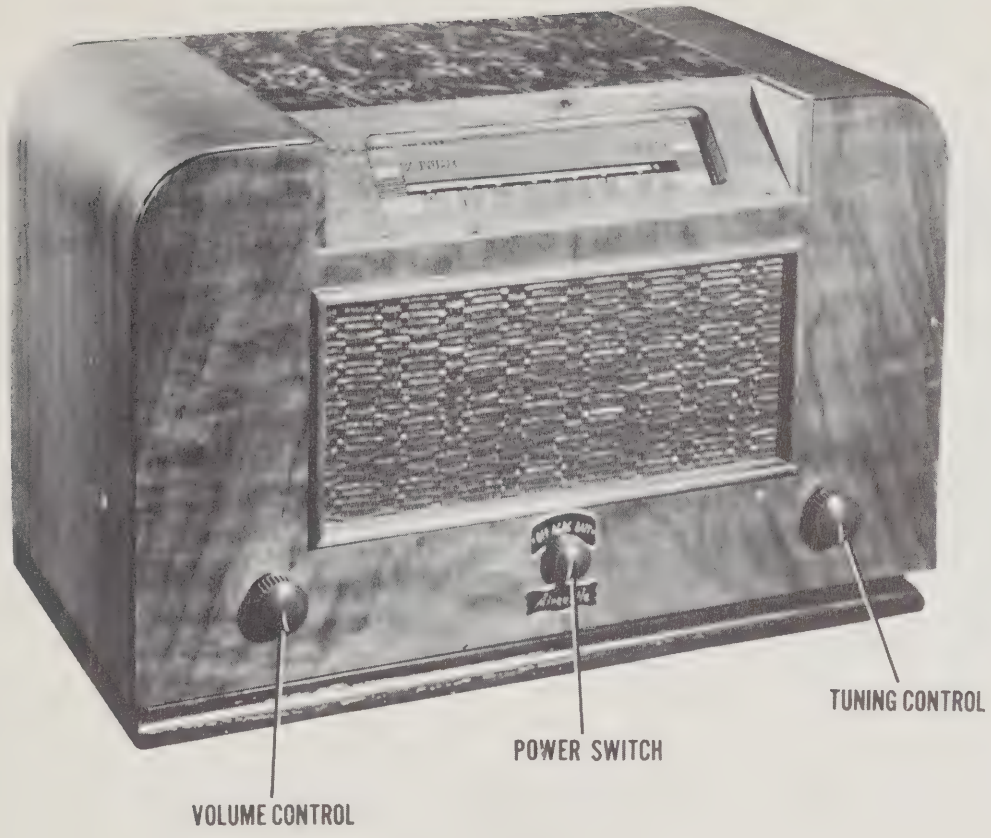
(106 Series)


6AU6 SOUND I-F V101
6AU6 LIMITER V102
6AL5 RATIO DET. V103
12AX7 A-F AMP & INV V104
6V6GT A-F OUTPUT V105
V106
6CB6 1ST VIDEO I-F V201
6CB6 2ND VIDEO I-F V202
6CB6 3RD VIDEO I-F V203
6CB6 4TH VIDEO I-F V204
6AU6 VIDEO AMP V205
6V6GT VIDEO OUTPUT V206
21EP4A V207
6AU6 A.G.C. AMP V208
12AX7 NOISE INV. V301A SYNC SEP. V301B
6SN7GT SYNC AMP V302A SYNC CLIPPER V302B
6SN7GT VERT. MV. V303A VERT. DISCHARGE V303B
6W6GT VERT. OUTPUT V304
6AL5 HOR. A.F.C. V305
6SN7GT-A HOR. OSC. V401
6BQ6GT HOR. OUTPUT V402
1B3GT H.V. RECT. V403
6AX4GT DAMPER V404
5U4G RECTIFIERS V501 V502

Radio Plug J504 not used in 381 Series Models.

Schematic Diagram Courtesy of Magnavox Co.

AIRCASTLE MODEL 5024
BATTERY-LINE OPERATED



AIRCASTLE MODEL 5024

TRADE NAME	Aircastle, Model 5024
SUPPLIER	Spiegel, Inc., 1061 W. 35th St., Chicago, Ill.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1A7GT Converter, 1N5GT IF Amp., 1H5GT Det.-AVC-AF, 3Q5GT Power Output.
POWER SUPPLY	110-125 Volts AC-DC or 9 Volts "A" Supply and 90 Volts "B" Supply in Pack Form
RATING	.13 Amp. @ 117 Volts AC or 48MA @ 9 Volts DC and 11MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200 MMF to reduce hum modulation.
2	.1 MFD	"	1650KC	"	"	A5	Adjust for maximum output.
3		Loop	1400KC	Tune for maximum output.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under international Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

AIRCASTLE MODEL 5024
BATTERY-LINE OPERATED

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1A7GT	1A7GT	7Z	
2	IF Amp.	1N5GT	1N5GT	5Y	
3	Det.-AVC-AF	1H5GT	1H5GT	5Z	
4	Power Output	3Q5GT	3Q5GT	7AP	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRCASTLE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	40	150		PRSA150/40-40	EDL4415	DSB-2x40-150	TA-440	Filter-Blue
B	20	150		PRS150/20	BR2015	M-20-150	UT-201	" -Yellow
C	40	150						" -Red
6	70	25	EC6	PRS25/100	BRH251	M-100-25	UHC-102	Fil. Bypass
7	.1	400	PC-8	484-.1	DT4P1	ST-4-1	TC-1	Line Filter
8	.1	400	PC-8	484-.1	DT4P1	ST-4-1	72P2	Line Isolation
9	.005	600	PC-6	684-.005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
10	.005	600	PC-6	684-.005	DT6D5	ST-6-005	TC-25	Audio Coup.
11	.05	200	PC-5	484-.05	DT2S5	ST-4-05	TC-15	Audio Plate Decoup.
12	.005	600	PC-6	684-.005	DT6D5	ST-6-005	TC-25	Audio Coup.
13	.1	400	PC-8	484-.1	DT4P1	ST-4-1	TC-1	IF Grid Filter
14	.05	200	PC-5	484-.05	DT2S5	ST-4-05	TC-15	Conv. Screen Bypass
15	.05	200	PC-5	484-.05	DT2S5	ST-4-05	TC-15	AVC Filter
16	100	500	MC-2	1468-.0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
17	100	500	MC-2	1468-.0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
18	100	500	MC-2	1468-.0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.

CONTROLS

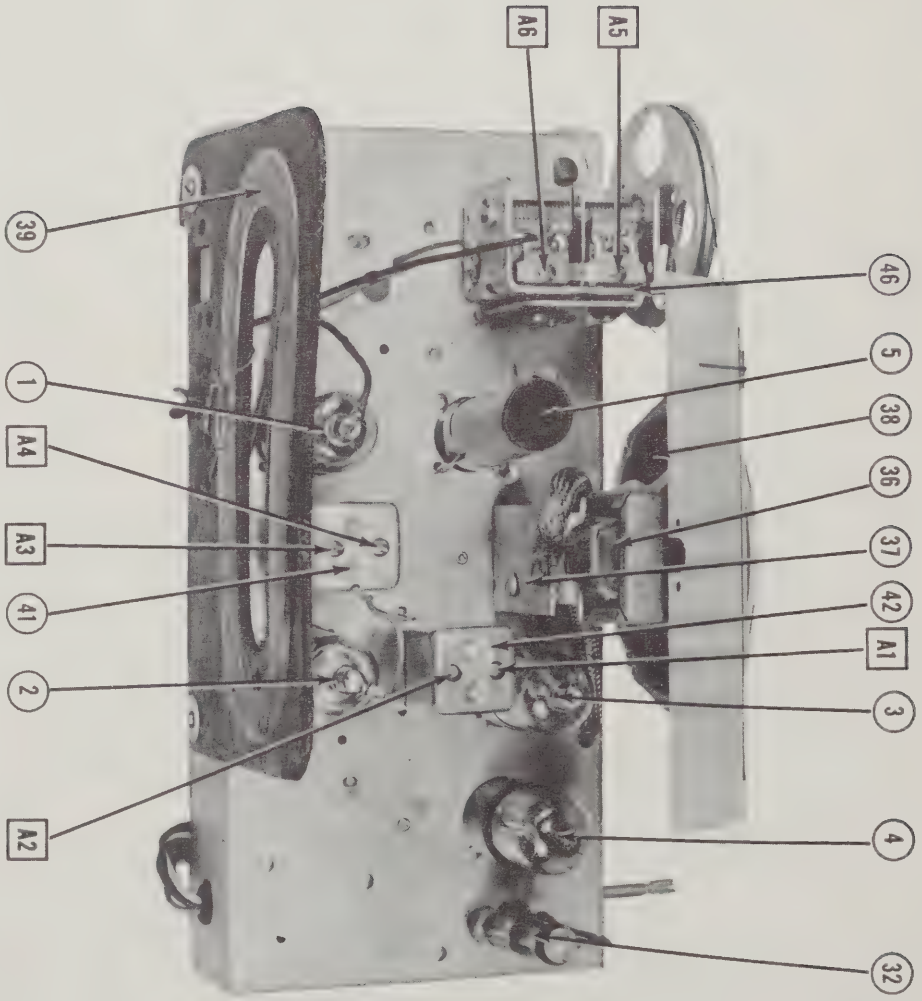
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
19A	1 Meg.	½	VC-2	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 19A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	IDENTIFICATION CODES
20	220KΩ	½	1R-20	BTS-220K	Red-Red-Yl. Osc. Grid
21	56KΩ	½		BTS-56K	Grn.-Blue-Or. Conv. Screen
22	3.3 Meg.	½	1R-23	BTS-3.3 Meg	Or.-Or.-Grn. AVC Network
23	82KΩ	½	1R-31	BTS-82K	Gray-Red-Or. Diode Load
24	10 Meg.	½	1R-3	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
25	1 Meg.	½	1R-12	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
26	470KΩ	½	1R-11	BTS-470K	Yl.-Vi.-Yl. AF Plate Decoup.
27	2.2 Meg.	½	1R-13	BTS-2.2 Meg	Red-Red-Grn. Output Grid
28	220KΩ	½	1R-20	BTS-220K	Red-Red-Yl. Line Isolation
29	82Ω	2	1R-35	BW-2-82	Gray-Red-Blk. Surge Limiter
30	560Ω	½	1R-39	BTS-560	Blue-Red-Br. Filter
31	680Ω	½	1R-39	BTS-680	Blue-Red-Br. "
32A	1050Ω	10		ABA-1250	Filament Dropping-See Note 1
B	1050Ω	10	WR-3A	ABA-1250	" " " " 1
C	40Ω	5		ABA-50	" " " " 2
33	270Ω	½	1R-26	BW-½-270	Red-Vi.-Br. Filament String
34	330Ω	½	1R-31	BW-½-330	Or.-Or.-Br. " "
35	680Ω	½	1R-32	BTS-680	Blue-Gray-Br. " "

Note 1-On IRC replacement set slider 1050Ω from end.
Note 2-On IRC replacement set slider 40Ω from end.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIRCASTLE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
36	9200Ω	3.3Ω	680Ω	.5Ω	Part of SPK-5	A-3948*	T22847*	A-2932*	*Bend mounting tabs down, file out slots and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			AIRCASTLE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-105#		‡Trim flange.
37	PM	3.3Ω	SPK-5	Mod. P5-X	5A15#‡	#Drill and tap magnet frame.
	CONE DIA.	VC DIA.				
38	4½"	3Ω				

R F COILS

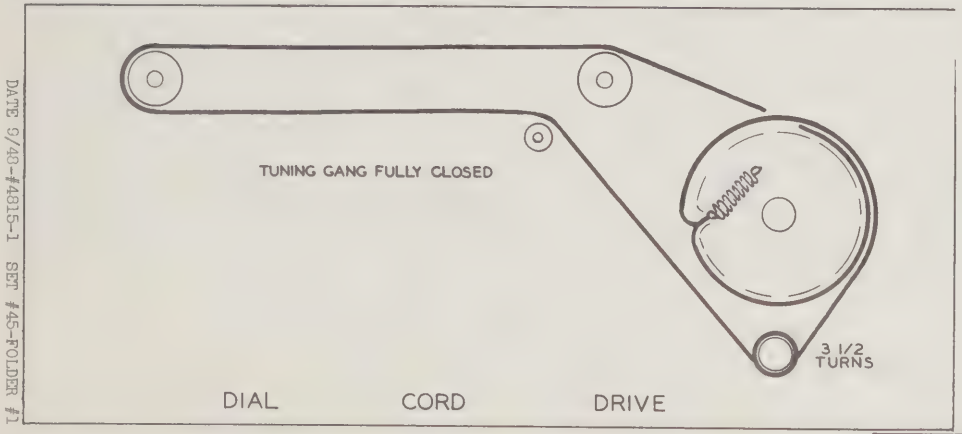
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	AIRCASTLE PART No.	MEISSNER PART No.
39	Loop Ant.	0Ω	1.5Ω	LL-10	
40	Osc. Coil	.3Ω	1Ω	LO-8	14-1060
41	Input IF	19Ω	19Ω	LI-3	16-6666
42	Output IF	19.5Ω	19Ω	LI-4	16-6667

BATTERIES

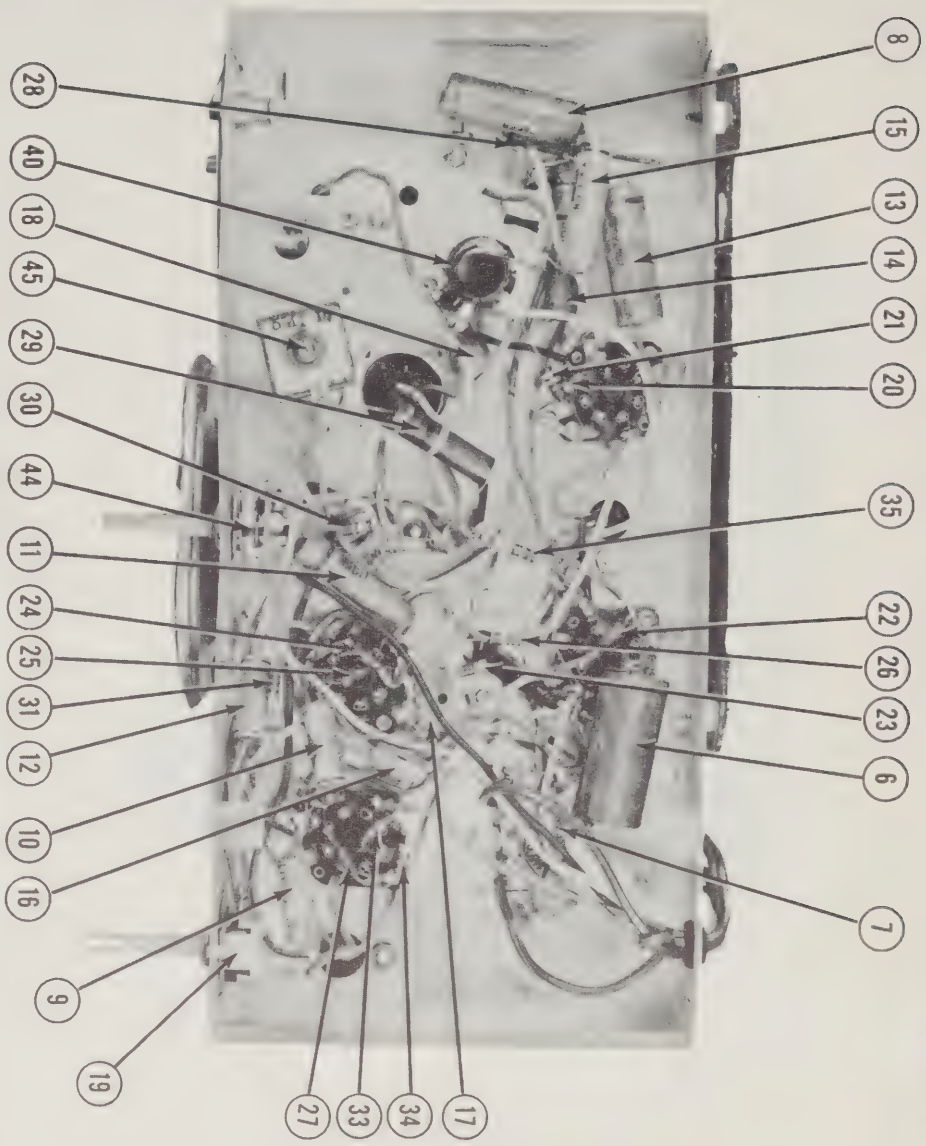
ITEM No.	VOLTAGE	AIRCASTLE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
43	9V "A" 60V "B"				#754			G6M60	

MISCELLANEOUS

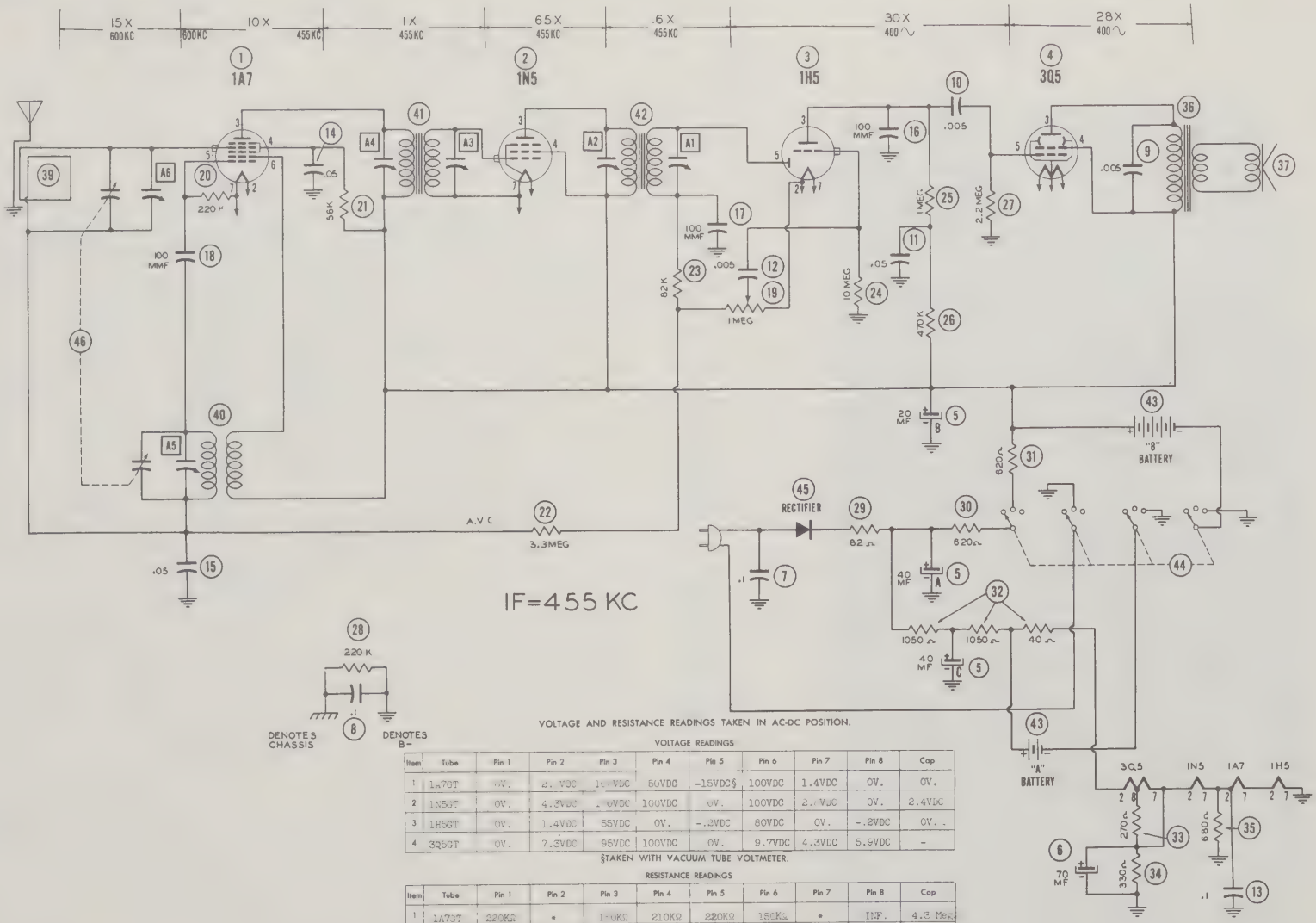
ITEM No.	PART NAME	AIRCASTLE PART No.	NOTES
44	Switch	SW-5	AC/DC-Batt.
45	Rectifier	SR-1	Selenium
46	2 Gang Var. Cap.	GC-4	(30-470MMF, 30-190MMF)



CHASSIS—BOTTOM VIEW



DATE 9/40-#4815-1 SET #45-FOLDER #1
AIRCASTLE MODEL 5024 BATTERY-LINE OPERATED



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1A7GT	0V.	2. VDC	10 VDC	50VDC	-15VDC§	100VDC	1.4VDC	0V.	0V.
2	1N5GT	0V.	4.3VDC	0VDC	100VDC	0V.	100VDC	2.6VDC	0V.	2.4VDC
3	1H5GT	0V.	1.4VDC	55VDC	0V.	-.2VDC	80VDC	0V.	-.2VDC	0V.
4	3Q5GT	0V.	7.3VDC	95VDC	100VDC	0V.	9.7VDC	4.3VDC	5.9VDC	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1A7GT	220KΩ	*	1.0KΩ	210KΩ	220KΩ	150KΩ	*	INF.	4.3 Meg.
2	1N5GT	220KΩ	*	150KΩ	150KΩ	1 Meg.	150KΩ	*	5 Meg.	*
3	1H5GT	INF.	*	1.6 Meg.	10 Meg.	1.1 Meg.	500KΩ	0Ω	1.1 Meg.	10 Meg.
4	3Q5GT	0Ω	*	1 Meg.	150KΩ	1.2 Meg.	100Ω	*	*	-

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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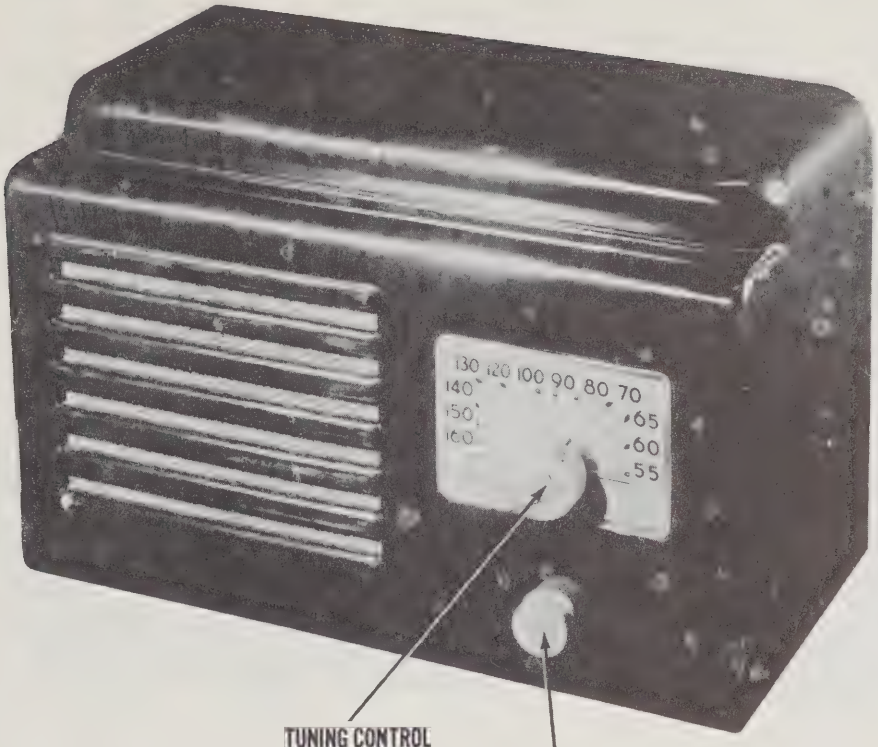
4815-1

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

AIRCASTLE MODEL
5052



AIRCASTLE MODEL
5052

AIRCASTLE MODEL 5052

TRADE NAME	Aircastle, Model 5052
SUPPLIER	Spiegel, Inc., 1061 W. 35th St., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	110-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1650KC RATING .22 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	.1 MFD	"	1650KC	"	"	A5	Adjust for maximum output.
3		Loop	1400KC	Tune for maximum output.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

AIRCASTLE MODEL 5052

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		AIRCASTLE PART No.	STANDARD REPLACEMENT		
1	Converter	12SE6	12SE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	AIRCASTLE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
6A	40	150		PRSA150/40-20	EDL4215	DSB-3x20-150#	TA-240	Filter-Red
B	20	150						-Yellpw
7	.05	400		484-.05	DT4S5	ST-4-05	TC-15	Line Filter
8	.1	400		484-.1	DT4P1	ST-4-1	72P2	Line Isolation
9	.01	400		484-.01	DT4S1	ST-4-01	TC-11	Output Plate Bypass
10	.005	600		684-.005	DT6D5	ST-6-005	TC-25	Audio Coupling
11	.01	400		484-01	DT4S1	ST-4-01	TC-11	" "
12	.05	400		484-.05	DT4S5	ST-4-05	TC-15	IF Cathode Bypass
13	.05	400		484-.05	DT4S5	ST-4-05	TC-15	AVC Filter
14	.01	400		484-.01	DT4S1	ST-4-01	TC-11	Ant. Coupling
15	330	500		1468-.00035	5W5T3	MO.5-33	1FM-335	AF Plate Bypass
16	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Diode RF Coupling
17	50	500		1468-.00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
18	25	500		1469-.000025	5W5Q25	MO8.5-425	MS-425	Fixed Trimmer-See Note

Note-Not used in all models.
#-Parallel sections to obtain desired capacity.

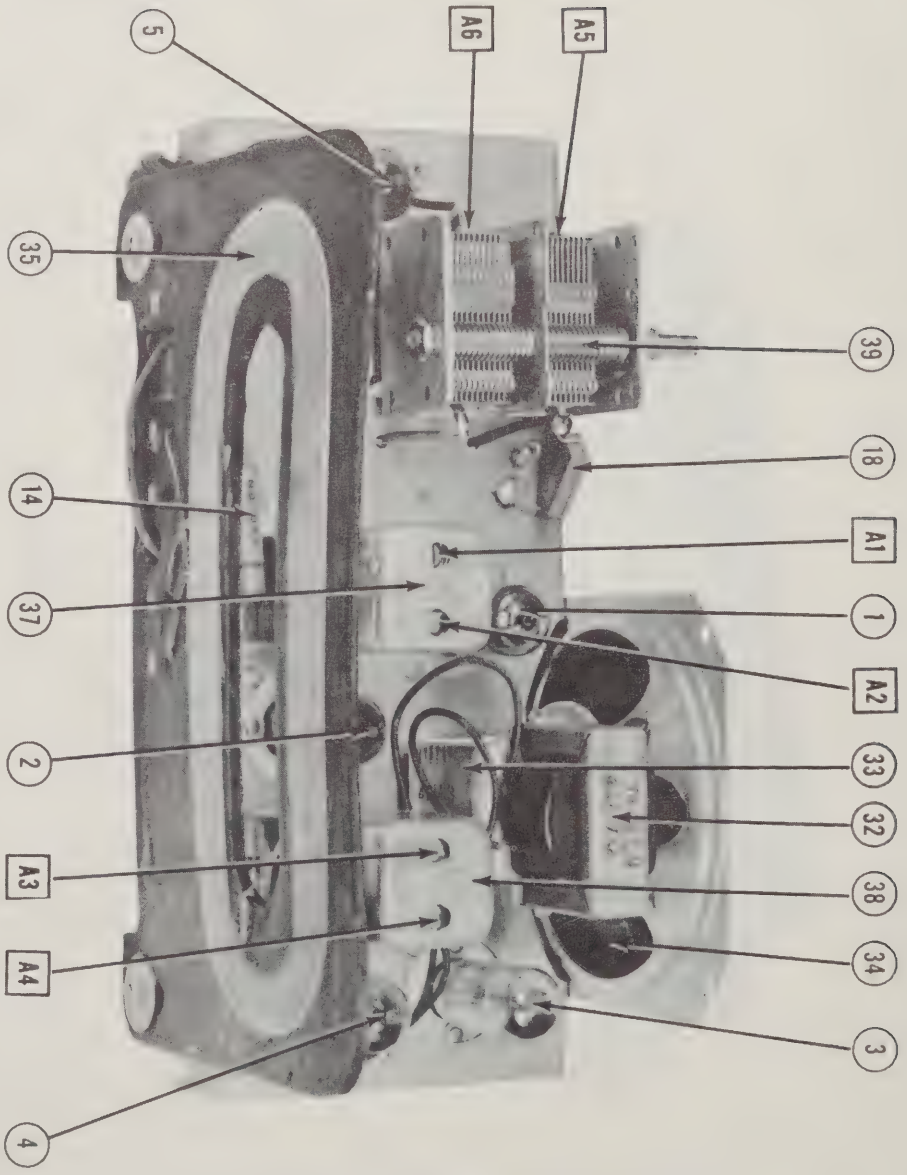
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	AIRCASTLE PART No.	IRC PART No.	CLAROSTAT PART No.	
19A	1 Meg.	½	VC-9	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 19A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIRCASTLE PART No.	IRC PART No.	
20	20KΩ	½		BTS-22K	Red-Blk.-Or. Osc. Grid
21	2.2 Meg.	½	1R-23	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
22	100Ω	½	1R-36	Bw-½-100	Br.-Blk.-Br. IF Cathode-See Note 1
23	56KΩ	½		BTS-56K	Grn.-Blue-Or. Diode Filter
24	2.2 Meg.	½	1R-23	BTS-2.2 Meg.	Red-Red-Grn. AF Grid

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIRCASTLE PART No.	IRC PART No.	
25	470KΩ	½	1R-11	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
26	470KΩ	½	1R-11	BTS-470K	Yl.-Vi.-Yl. Output Grid-See Note 2
27	150Ω	½	1R-14	BW-½-150	Br.-Grn.-Br. Output Cathode
28	2200Ω	1	1R-25	BTA-2200	Red-Red-Red Filter
29	33Ω	½	1R-17	BW-½-33	Or.-Or.-Blk. Surge Limiter-See Note 3
30	33Ω	½	1R-17	BW-½-33	Or.-Or.-Blk. Rect. Ballast
31	220KΩ	½	1R-20	BTS-220K	Red-Red-Yl. Line Isolation

Note 1-Some models use two 220Ω 1/2 w. resistors in parallel in this application.
Note 2-Some models use two 1 Meg. 1/2 w. resistors in parallel in this application.
Note 3-Not used in all models.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIRCASTLE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
32	2300Ω	3.4Ω	150Ω	.5Ω	Part of SPK-6	A-3876*	T22S45*	A-2928*	*Bend mounting tabs down, file out slots and mount on orig. bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	VC IMP.	AIRCASTLE PART No.	JENSEN PART No.	QUAM PART No.	
33	PM	3.4Ω	SPK-6	ST-113‡ Mod. P4-X	4A07	‡Enlarge cutout
	CONE DIA.	VC DIA.				
34	4"	9/16"				

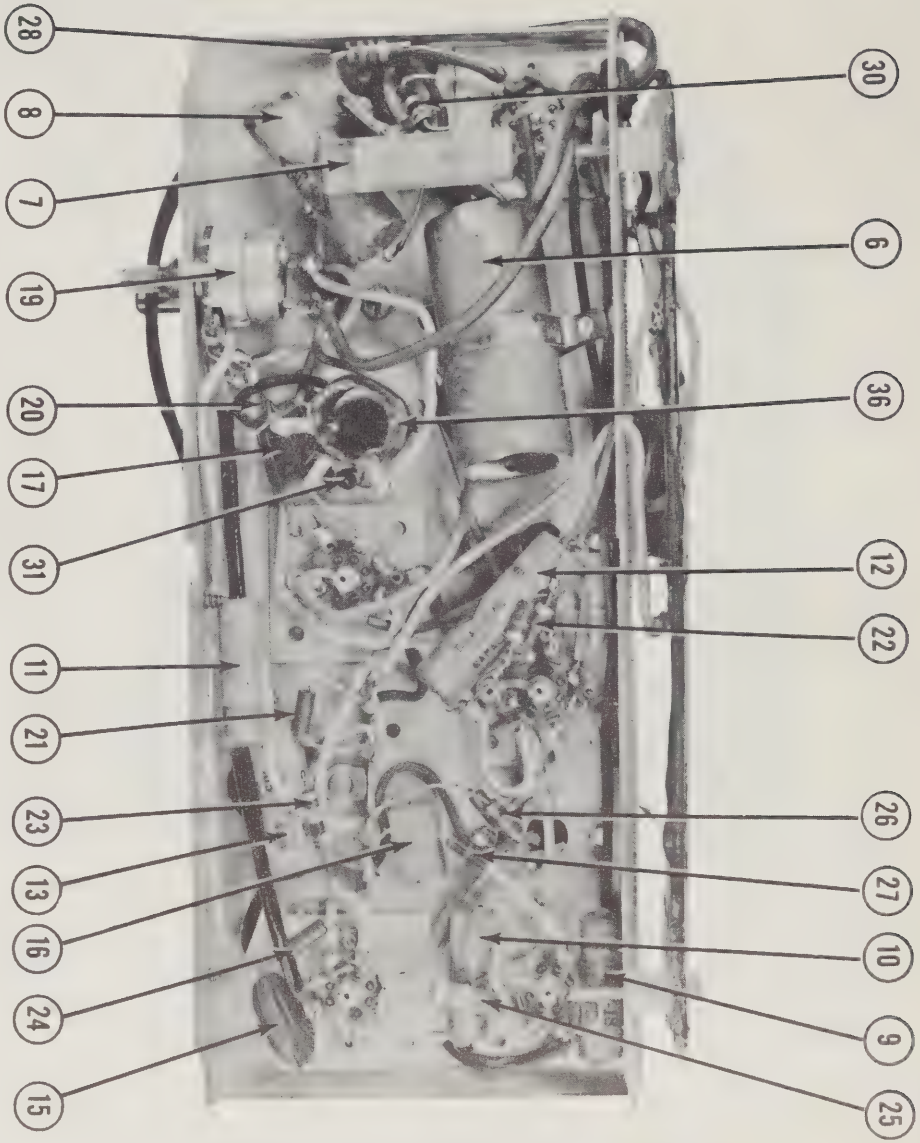
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	AIRCASTLE PART No.	MEISSNER PART No.
35	Loop Ant.	.1Ω	2Ω	LL-12	
36	Osc. Coil	.7Ω	7Ω	LO-13	14-1060
37	Input IF	20.5Ω	20.5Ω	LI-6	16-6666
38	Output IF	20.5Ω	20.5Ω	LI-7	16-6667

MISCELLANEOUS

ITEM No.	PART NAME	AIRCASTLE PART No.	NOTES
39	2 Gang Var. Cap.	GC-7	(20-450MMF, 30-195MMF)

CHASSIS—BOTTOM VIEW

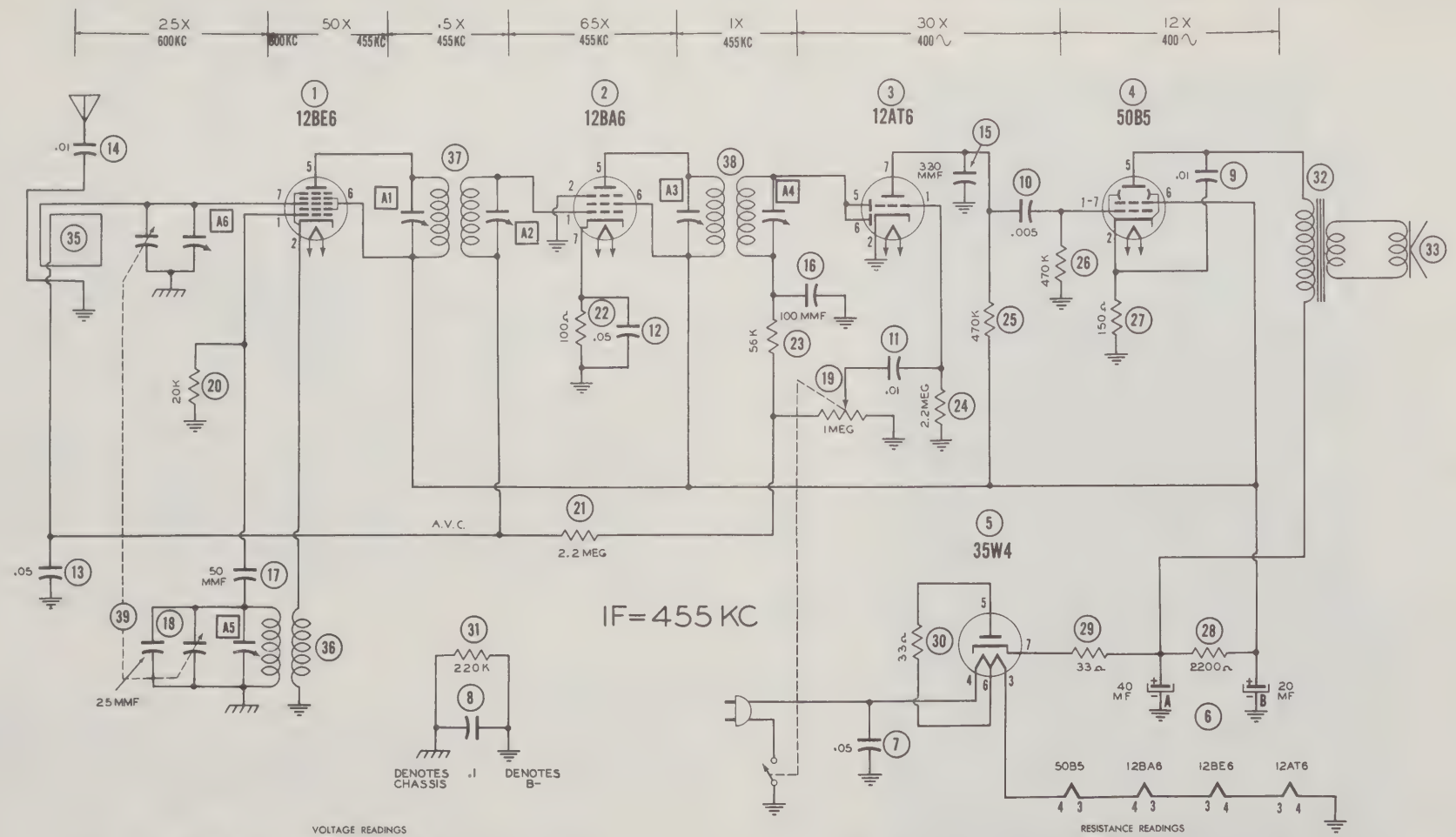


DATE 9/48-#4815-2

SET #45-FOLDER #2

AIRCASTLE MODEL 5052

AIRCASTLE MODEL 5052



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-4.2V. C§	0V.	24VAC	12VAC	78VDC	75VDC	-1VDC
2	12BA6	-.2VDC	0V.	24VAC	35VAC	78VDC	75VDC	.7VDC
3	12AT6	-.4VDC	0V.	12VAC	0V.	-.6VDC	-.6VDC	30VDC
4	50B5	0V.	3.1VDC	35VAC	80VAC	100VDC	78VDC	0V.
5	35W4	0V.	0V.	80VAC	117VAC	105VAC	110VAC	105VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	20KΩ	.7Ω	25Ω	13Ω	250KΩ	250KΩ	3.3 Meg.
2	12BA6	3.2 Meg.	0Ω	25Ω	38Ω	250KΩ	250KΩ	110Ω
3	12AT6	2.2 Meg.	0Ω	13Ω	0Ω	1 Meg.	1 Meg.	720KΩ
4	50B5	50KΩ	150Ω	38Ω	90Ω	250KΩ	250KΩ	500KΩ
5	35W4	INF.	INF.	90Ω	120Ω	150Ω	110Ω	250KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4815-2

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

AIRCASTLE MODEL
7553

AIRCASTLE MODEL
7553

AIRCASTLE MODEL 7553

TRADE NAME	Aircastle, Model 7553
SUPPLIER	Spiegel, Inc., 1061 W. 35th St., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 14Q7 Converter, 14A7 IF Amp., 14B6 Det.-AVC-AF, 50A5 Power Output, 35Y4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1700KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD.	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	100 MMFD	High side to ext. ant. lead. Low side to B-.	1720KC	"	"	A5	Adjust for maximum output.
3	100 MMFD	"	1500KC	Tune for maximum output.	"	A6	" " " "

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

AIRCASTLE MODEL 7553

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	14Q7	14Q7	8AL	
2	IF Amp.	14A7	14A7	8V	
3	Det.-AVC-AF	14B6	14B6	8W	
4	Power Output	50A5	50A5	6AA	
5	Rectifier	35Y4	35Y4	5AL	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRCASTLE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	30	150		PRSA-150/30-30	EZ3315	DSB-2x30-150	TA-330	Filter-Red
B	30	150						" - "
7	.05	400		484-.05	DT4S5	ST-4-05	TC-15	Line Filter
8	.2	200		484-.2	DT4P2	ST-4-2	72P3	Line Isolation
9	.02	200		484-.02	DT2S2	ST-4-02	TC-12	Audio Coup.
10	.005	600		684-.005	DT6D5	ST-6-005	TC-25	" "
11	.02	200		484-.02	DT2S2	ST-4-02	TC-12	AVC Filter
12	.002	600		684-.002	DT6D2	ST-6-002	TC-22	Ext. Ant. Isolation
13	8&0	500		684-.0075	DT6D6	ST-6-006	TC-26	Output Plate Bypass
14	250	500		1468-.00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
15	250	500		1468-.00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
16	250	500		1468-.00025	5W5T25	MO.5-325	1FM-325	Osc. Grid Cap.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
17A	500KΩ	2		D13-133	M-60-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 17A per instructions
C	Switch			41	SW-A	" " " " " "

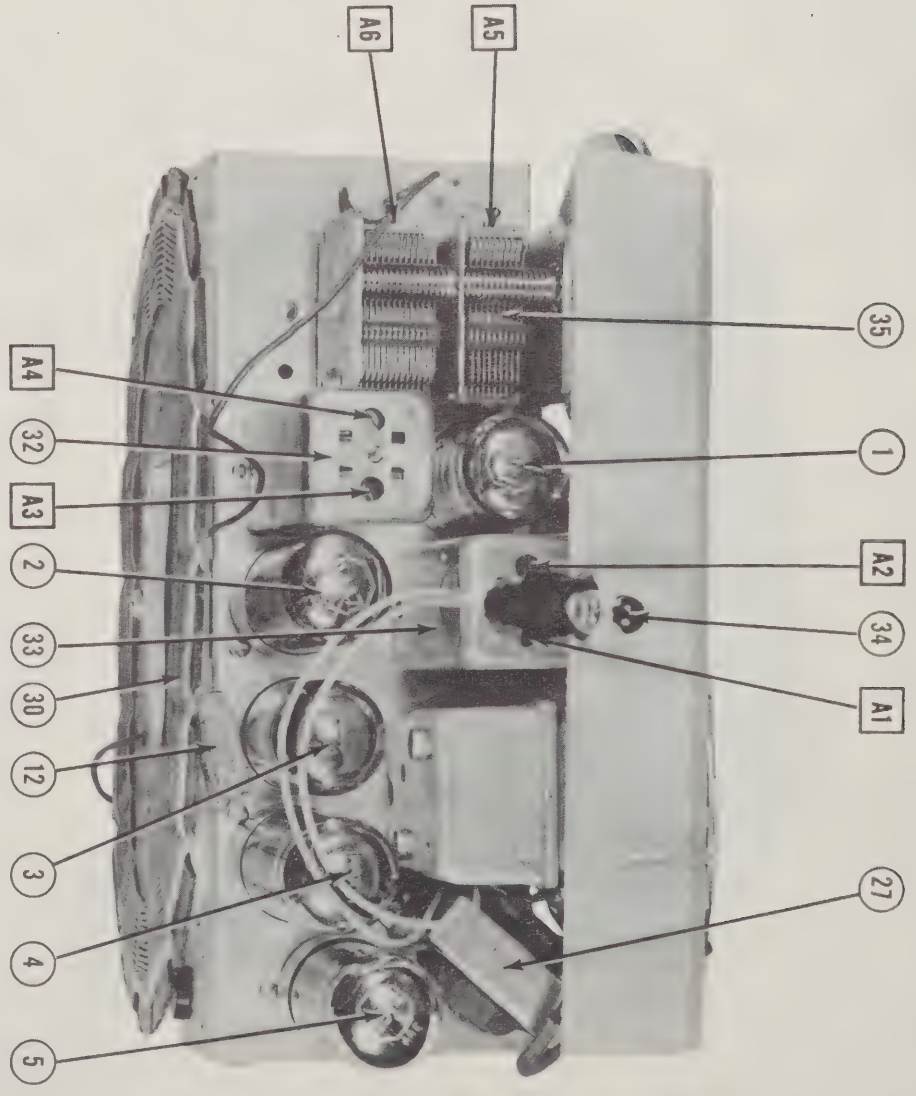
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
18	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue AVC Network
19	22KΩ	½		BTS-22K	Red-Red-Or. Osc. Grid
20	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
21	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue AF Grid
22	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Plate Load
23	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
24	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
25	1000Ω	5		AB-1000	Br.-Blk.-Red Filter
26	220KΩ	½		BTS-220K	Red-Red-Yl. Line Isolation

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
27	2750Ω	3.5Ω	200Ω	.5Ω		A-3876	T22S45	A-2928	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: AIRCASTLE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-109‡		‡Drill and tap magnet frame.
23	PM	3.5Ω		Mod. P4-X	5A15‡	
	CONE DIA.	VC DIA.				
2[illegible]	4-3/4"	9/16"				

R F COILS

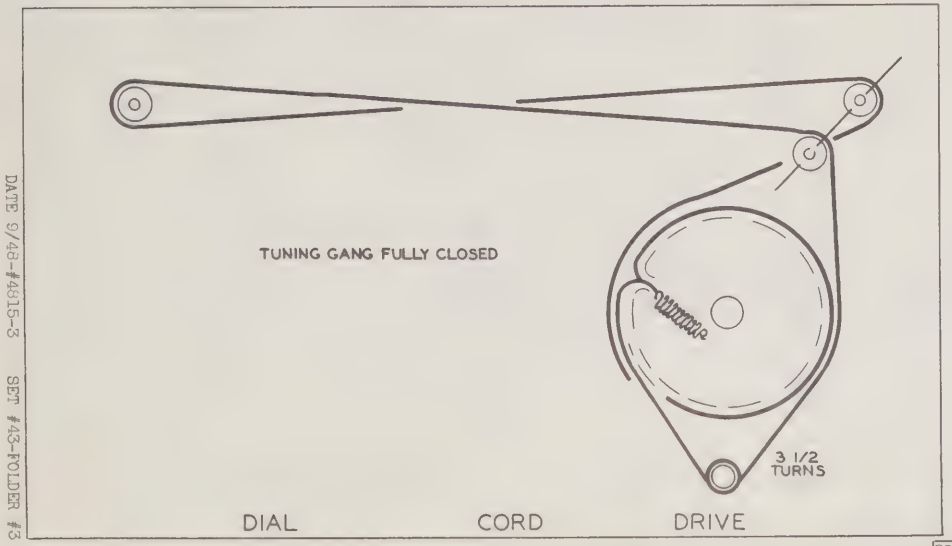
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIRCASTLE PART No.	MEISSNER PART No.
30	Loop Ant.	0Ω	1.3Ω		
31	Osc. Coil		5.7Ω		14-1060
32	Input IF	31Ω	30.3Ω		16-6658
33	Output IF	30.7Ω	30.3Ω		16-6660

DIAL LIGHT

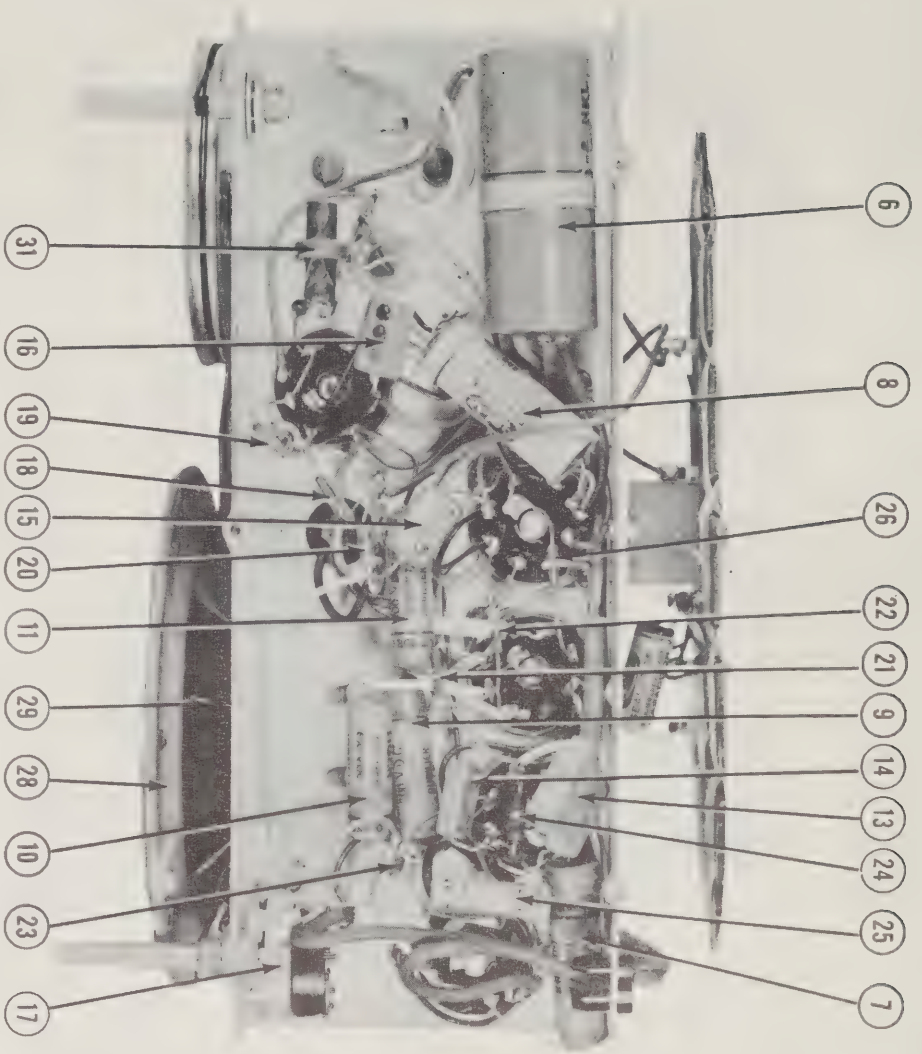
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: AIRCASTLE PART No.		INSTALLATION NOTES
34	Bayonet	6-8	0.15	Brown			Type #47

MISCELLANEOUS

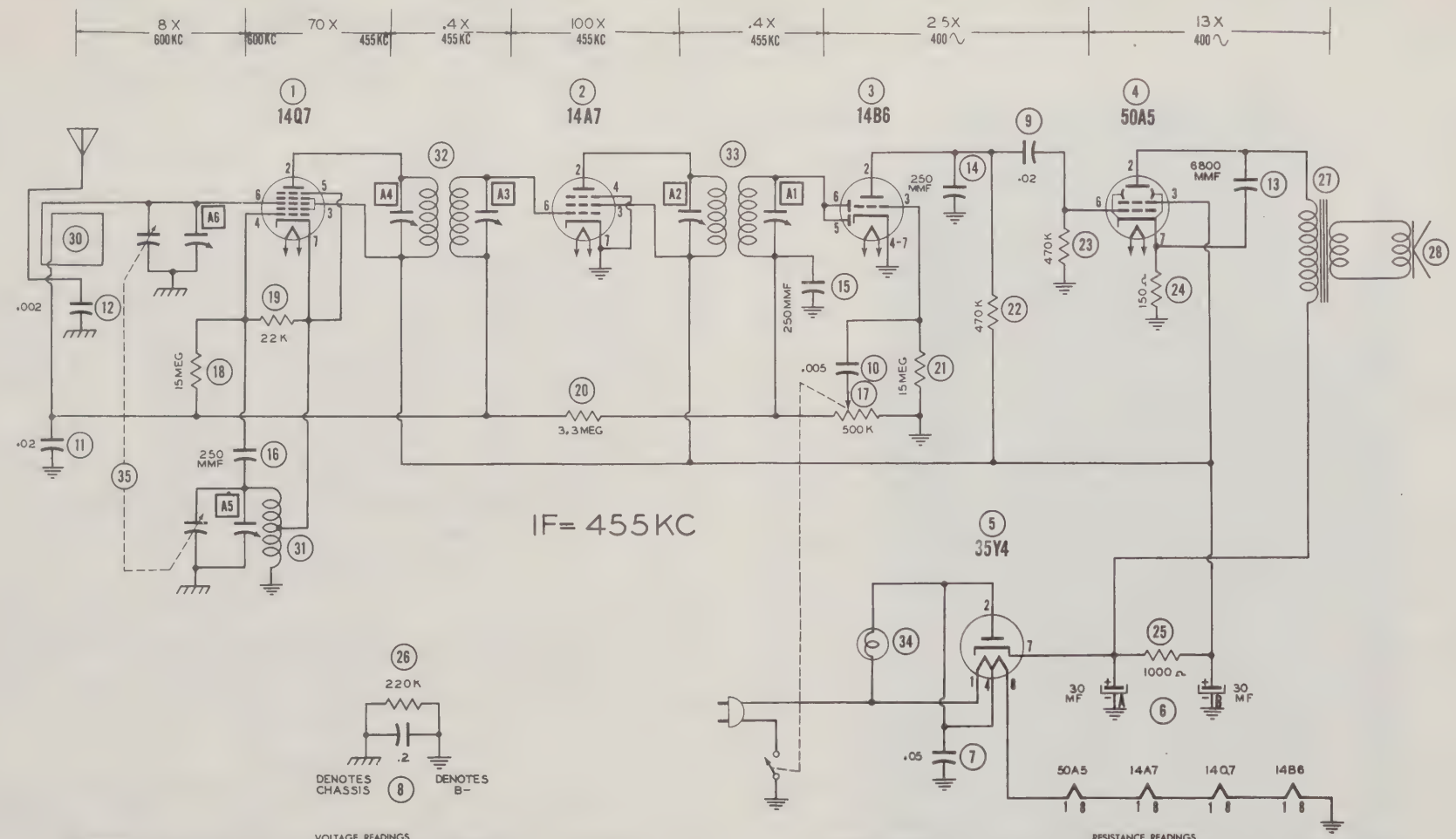
ITEM No.	PART NAME	AIRCASTLE PART No.	NOTES
35	2 Gang Var. Cap		(45-490MMF, 45-210MMF)



CHASSIS—BOTTOM VIEW



AIRCASTLE MODEL 7552



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	26VAC	100VDC	100VDC	-11.5VDC§	0V.	-.4VDC	0V.	14VAC
2	14A7	38VAC	100VDC	100VDC	0V.	0V.	-.4VDC	0V.	26VAC
3	14B6	14VAC	65VDC	-.8VDC	0V.	-.9VDC	-.9VDC	0V.	0V.
4	50A5	90VAC	115VDC	100VDC	0V.	0V.	0V.	7VDC	38VAC
5	35Y4	117VAC	115VAC	0V.	115VAC	117VAC	125VDC	125VDC	90VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	25Ω	70KΩ	70KΩ	22KΩ	.6Ω	3.5 Meg.	.6Ω	13Ω
2	14A7	38Ω	70KΩ	70KΩ	0Ω	220KΩ	3.5 Meg.	0Ω	25Ω
3	14B6	13Ω	540KΩ	15 Meg.	0Ω	500KΩ	500KΩ	0Ω	0Ω
4	50A5	90Ω	70KΩ	70KΩ	0Ω	0Ω	470KΩ	150Ω	38Ω
5	35Y4	120Ω	115Ω	INF.	115Ω	120Ω	70KΩ	70KΩ	90Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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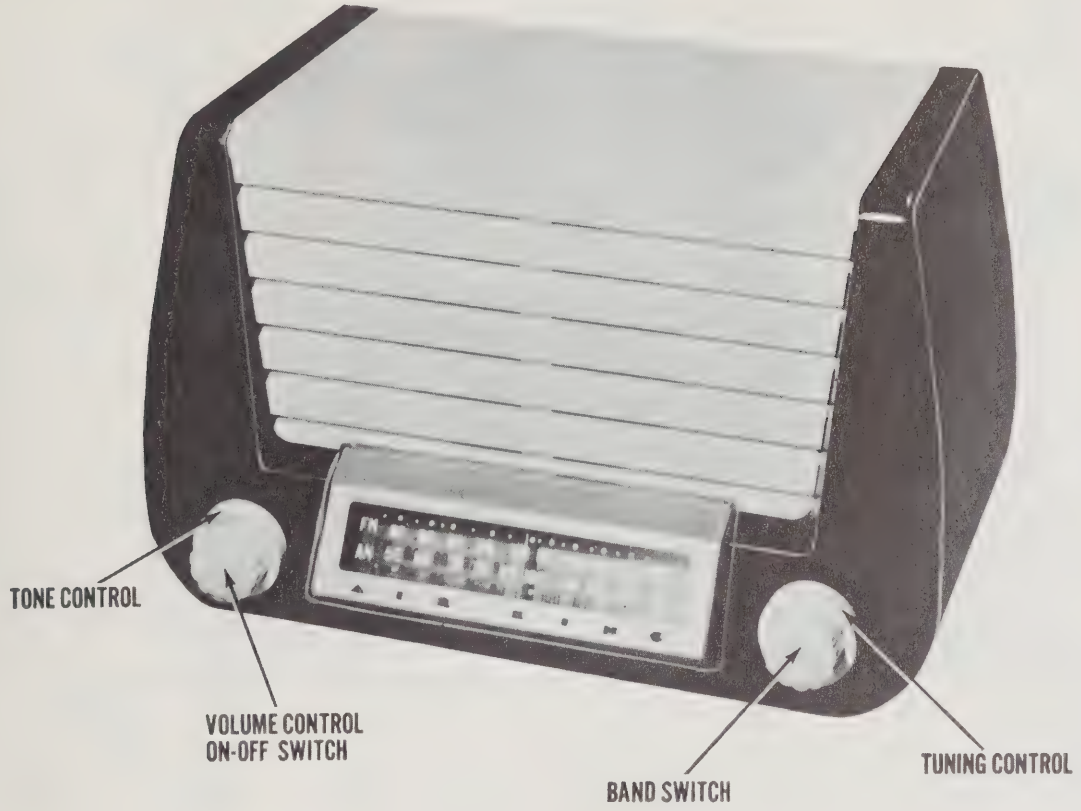
4815-3

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



AIR KING MODEL
A-650

AIR KING MODEL
A-650

AIR KING MODEL A-650

TRADE NAME	Air King, Model A-650
MANUFACTURER	Air King Products Co., 170 - 53rd St., Brooklyn 19, N.Y.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 14F8 FM Converter, 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF, 35L6GT Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1650KC — FREQ. MOD. 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning cap. fully closed and set pointer 13/16" from left edge of dial backplate. This is the calibration mark referred to in Steps below.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of sig. gen. and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to Pin 8 (grid) of 12SA7. Low side to B-.	455KC	AM (fully counter-clock-wise)	Tuning cap. fully open.	Across voice coil	A1, A2, A3, A4.	Adjust for maximum output If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	200MMFD	High side to ext. ant. terminal. Low side to B-.	1400KC	"	3-17/32" from calibration mark.	"	A5	Adjust for maximum output
3	200MMFD	"	"	"	Tune for maximum output.	"	A6	" " " "
4		Place sig. gen. output lead near receiver. (No direct connection).	21.75MC (400 ∿ AM)	FM (Clock-wise)	Tuning cap. fully open.	"	A7	" " " "
5		"	108MC (400 ∿ AM)	"	"	"	A8	" " " "
6		"	105MC (400 ∿ AM)	"	Tune for maximum output.	"	A9	Rock tuning cap. and adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIR KING PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM Converter	14F8	14F8	8BW	
2	AM Converter	12SA7GT	12SA7GT	8AD	
3	IF Amp.	12SK7GT	12SK7GT	8N	
4	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

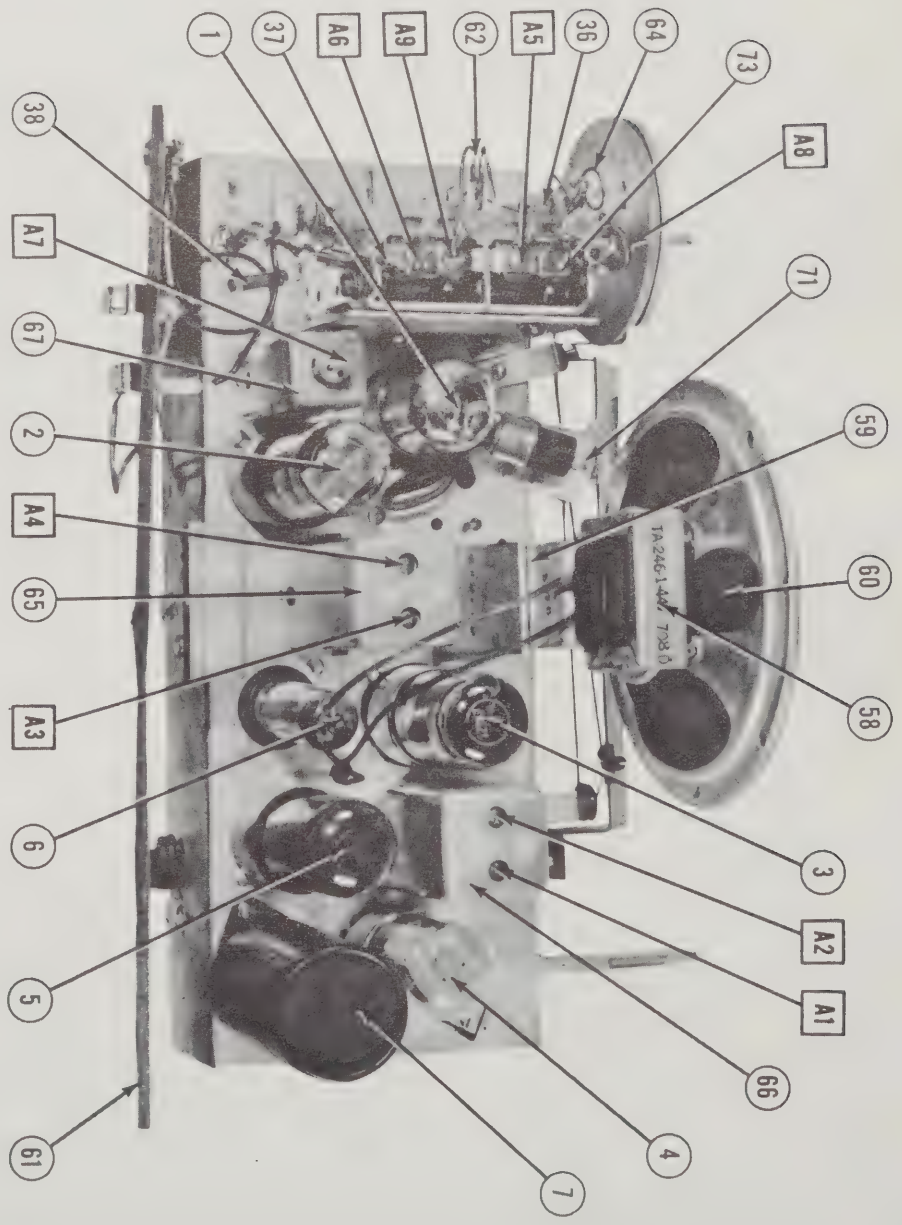
ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIR KING PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	40	150	2074	AF886D4A	UP44315C	DY-419	EL-443	■ Filter
B	40	150						● "
C	40	150						▲ "
D	25	25						Cathode Bypass
8	10	50		PRS50/10	BR105	M-10-50	TA-510	Stabilizing Cap.
9	.01	400		484-01	DT4S1	ST-4-01	TC-11	Line Filter
10	.05	600		684-05	DT6S5	ST-6-05	TC-15	Line Isolation
11	.05	400		484-05	DT4S5	ST-4-05	72P1	" "
12	.01	400		484-01	DT4S1	ST-4-01	TC-11	Output Plate Bypass
13	.02	400		484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
14	.005	400		484-005	DT6D5	ST-6-005	TC-25	Tone Comp.
15	.01	400		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
16	.02	400		484-02	DT4S2	ST-4-02	TC-12	" "
17	.25	400		484-.25	DT4P25	ST-4-25	TC-2	RF Bypass Pwr. Supply
18	.05	600		684-05	DT6S5	ST-6-05	TC-15	AVC Filter
19	.001	600		684-001	DT6D1	ST-6-001	TC-21	De-emphasis
20	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	Line Ant. Coupling
21	500	300		1468-0005	5W5T5	MO.5-35	1FM-35	Rectifier Bypass
22	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	Filament Bypass
23	220	300		1468-0002	5W5T2	MO.5-32	1FM-32	AF Plate Bypass
24	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
25	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	" " "
26	10	300		1469-00001	5R5Q1	MOS.5-41	MS-41	Fixed Trimmer
27	5000	300		1467-005	1D5D5	MW.5-25	1FM-25	RF Bypass
28	30	300			5R5Q3	MOS.5-43	MS-43	Regenerative Feedback
29	30	300			5R5Q3	MOS.5-43	MS-43	" "
30	2500	300		1464-0025	1R5D25	MWS.5-225		Quench Network
31	5000	300		1467-005	1D5D5	MW.5-25	1FM-25	RF Bypass
32	500	300		1468-0005	5W5T5	MO.5-35	1FM-35	RF Coupling
33	500	300		1468-0005	5W5T5	MO.5-35	1FM-35	Osc. Coupling
34	500	300		1468-0005	5W5T5	MO.5-35	1FM-35	RF Bypass
35	20	300			5W5Q2	MOS.5-42	MS-42	Osc. Grid Cap.
36	2	300						FM Osc. Coupling
37	2	300						FM Ant. Coupling
38	1000	300		1468-001	1W5D1	MW.5-21	1FM-21	Ext. Ant. Isolation

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIR KING PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
39A	500KΩ	½	2487			Volume Control & Sw.
B	250KΩ	½				Tone Control

Note-Dual control with concentric shaft.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIR KING PART No.	IRC PART No.	
40	22KΩ	½		BTS-22K	Red-Red-Or. AM Osc. Grid
41	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
42	68KΩ	½		BTS-68K	Blue-Gray-Or. Diode Filter
43	4.7 Meg.	½		BTS-4.7 Meg	Yl.-Vi.-Grn. AF Grid
44	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
45	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
46	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
47	22KΩ	½		BTS-22K	Red-Red-Or. FM Osc. Grid
48	100Ω	½			Br.-Blk.-Br. FM Osc. Decoup.
49	1500Ω	½		BTS-1500	Br.-Grn.-Red Quench Network
50	22KΩ	½		BTS-22K	Red-Red-Or. FM Conv. Cathode
51	22KΩ	½		BTS-22K	Red-Red-Or. FM IF Transformer Shunt
52	150KΩ	½		BTS-150K	Br.-Grn.-Yl. Voltage Dropping
53	100KΩ	½		BTS-100K	Br.-Blk.-Yl. De-emphasis
54	1000Ω	½		BTS-1000	Br.-Blk.-Red Filter
55	2200Ω	2		BT-2-2200	Red-Red-Red Filter
56	18Ω	½		BW-½-18	Br.-Gray-Blk. Rectifier Ballast
57	220KΩ	½		BTS-220K	Red-Red-Yl. Line Isolation

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIR KING PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
58	3200Ω	3.2Ω	170Ω	.7Ω	Part of 5876	A-3876#	T22846#	A-2928#	#Bend mounting tabs down, file out slots and mount on original brackets.

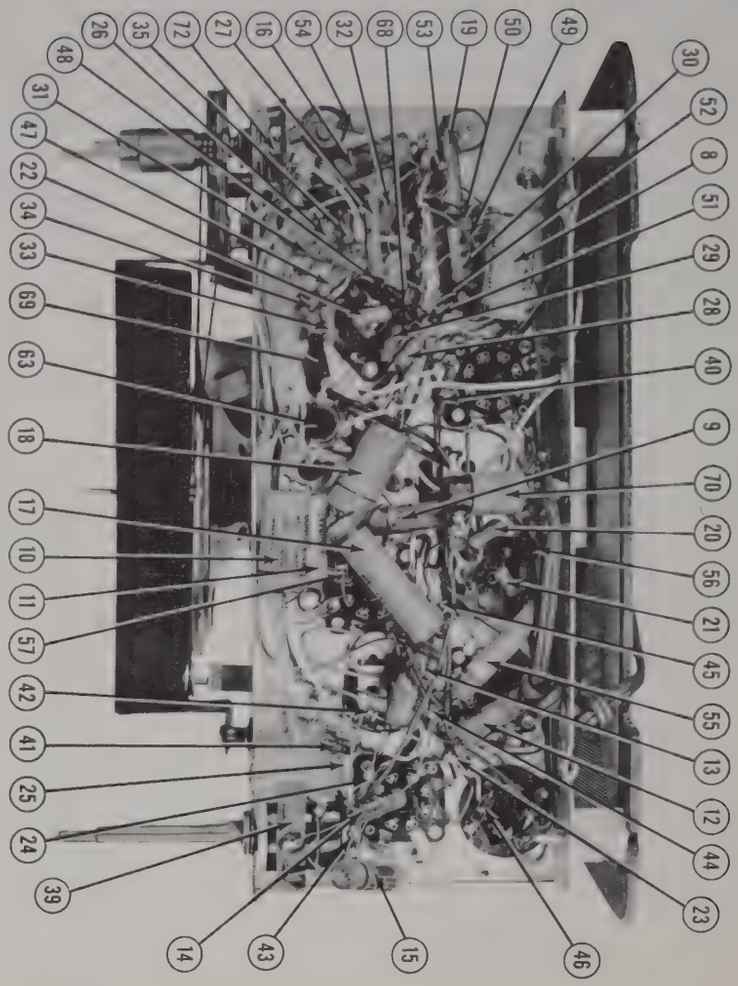
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	VC IMP.	AIR KING PART No.	JENSEN PART No.	QUAM PART No.	
59	PM	3.2Ω	5876	ST-105* Mod. P5-X	5A15*	*Fabricate new mounting bracket.
	CONE DIA.	VC DIA.				
60	4-5/8"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	AIR KING PART No.	MEISSNER PART No.	
61	Loop Ant.	.1Ω	2.6Ω	28216		
62	FM RF Coil		0Ω	28214		
63	BC Osc.Coil	.5Ω	5.8Ω	28211	14-1060†	†Add 50MMFD cap. from high side of tuning cap. to osc. grid.
64	FM " "		0Ω	28215		
65	AM Input IF	21Ω	20.8Ω	3371	16-6658	
66	AM Output IF	32.2Ω	31.8Ω	3535	16-6660	
67	FM IF	3.8Ω	.6Ω	3378		
68	RF Choke		.1Ω	28212		
69	" "		.1Ω	28212		
70A	Line Choke		0Ω	1401		
B	" "		0Ω	1401		

CHASSIS—BOTTOM VIEW



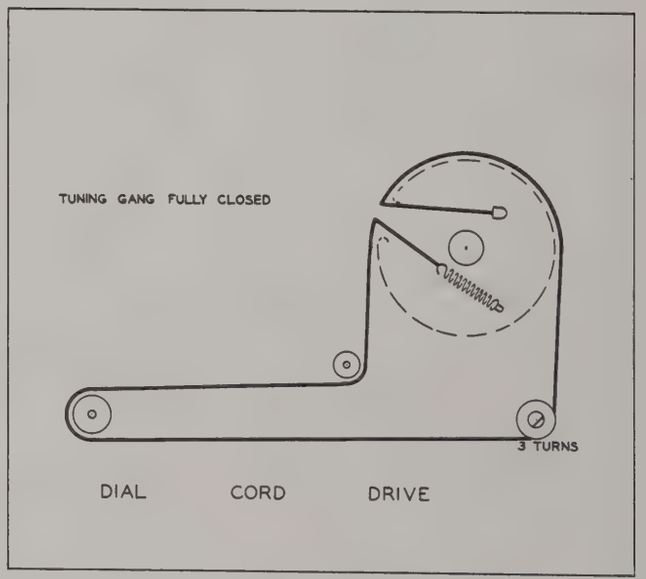
PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					AIR KING PART No.		
71	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	AIR KING PART No.	NOTES
72	Switch	3792	Band
73	2 Gang Var. Cap	1696	(5-475MMF, 10-185MMF)
	Dial Pointer	4144	



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	14F8	25VDC	12VAC	100VDC	50VDC	0V.	100VDC	0V.	-1.2VDC§
	2	12SA7GT	0V.	26VAC	75VDC	75VDC	-4.2VDC§	0V.	39VAC	-.6VDC
	3	12SK7GT	0V.	39VAC	0V.	-.8VDC	0V.	75VDC	80VAC	75VDC
	4	12SQ7GT	0V.	-.8VDC	0V.	-.8VDC	-.8VDC	80VDC	26VAC	12VAC
	5	35L6GT	0V.	80VAC	115VDC	75VDC	0V.	0V.	90VAC	5.8VDC
	6	35W4	0V.	0V.	90VAC	117VAC	115VAC	115VAC	120VDC	-

RESISTANCE READINGS

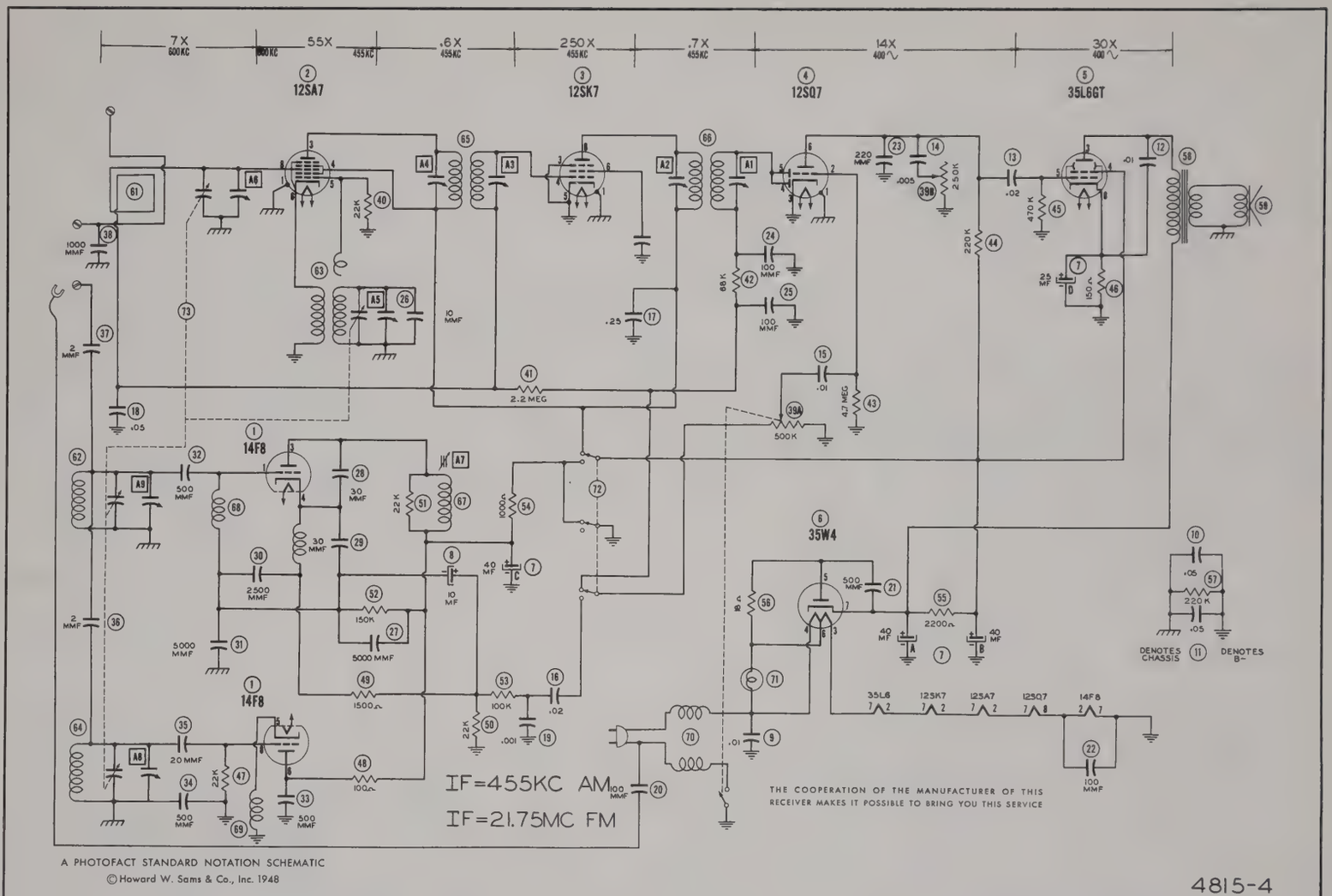
	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	14F8	230KΩ	11Ω	100KΩ	24KΩ	.1Ω	82KΩ	0Ω	22KΩ
	2	12SA7GT	220KΩ	25Ω	80KΩ	40KΩ	22KΩ	.5Ω	38Ω	2.7 Meg.
	3	12SK7GT	220KΩ	38Ω	0Ω	2.7 Meg.	0Ω	40KΩ	52Ω	80KΩ
	4	12SQ7GT	225KΩ	4.7 Meg.	0Ω	570KΩ	570KΩ	300KΩ	25Ω	11Ω
	5	35L6GT	220KΩ	52Ω	80KΩ	80KΩ	470KΩ	INF.	85Ω	15Ω
	6	35W4	INF.	0Ω	85Ω	115Ω	130Ω	110Ω	80KΩ	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



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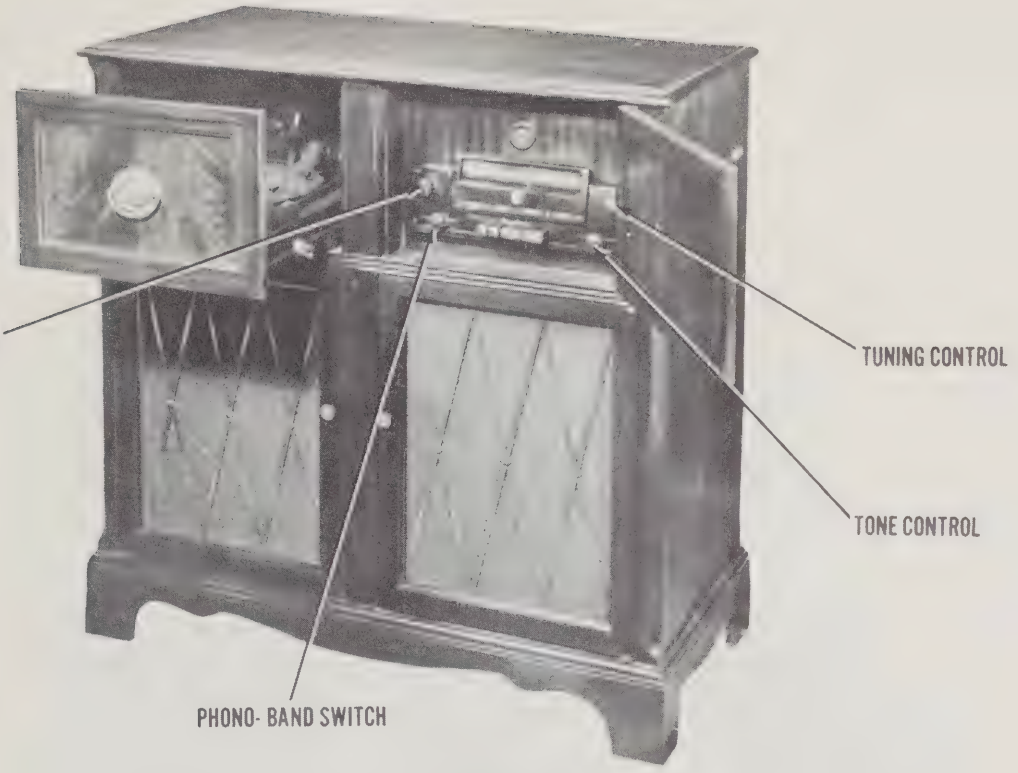
4815-4

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

DATE 9/48-4815-4 SET #45-FOLDER #4

AIRLINE MODELS 84WG-2718A, B;
84WG-2720A, 84WG-2724A



AIRLINE MODELS 84WG-2718A, B;
84WG-2720A, 84WG-2724A

AIRLINE MODEL 84WG-2720A

TRADE NAME	Airline, Models 84WG-2718A, B, 84WG-2720A, 84WG-2724A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio, 2 Band AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (TEN)	Types, 6BA6 RF Amp., 12AT7 FM Converter, 6BE6 AM Converter, 6BA6 FM-AM 1st IF Amp., 6BA6 FM 2nd IF Amp., 6AL5 FM Det., 6AV6 AM Det.-AVC-AF, 6U5/6G5 Tuning Eye, 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.73 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1600KC SHORT WAVE 5.8-18MC FREQ. MOD. 88-108MC

PUSHBUTTON ADJUSTMENTS

1. Turn receiver on and allow it to warm up for at least 15 minutes.
2. Remove buttons by pulling out and loosen set screws for each button.
3. Manually tune in station desired to be set up.
4. Holding manual control firmly, depress any button lever completely.
5. With button lever depressed completely tighten set screw firmly.
6. To check accuracy of setting detune with manual control and retune with button lever. If setting is off repeat Steps 3 through 6.
7. To set up the remaining buttons follow the same procedure outlined above.
8. Replace buttons.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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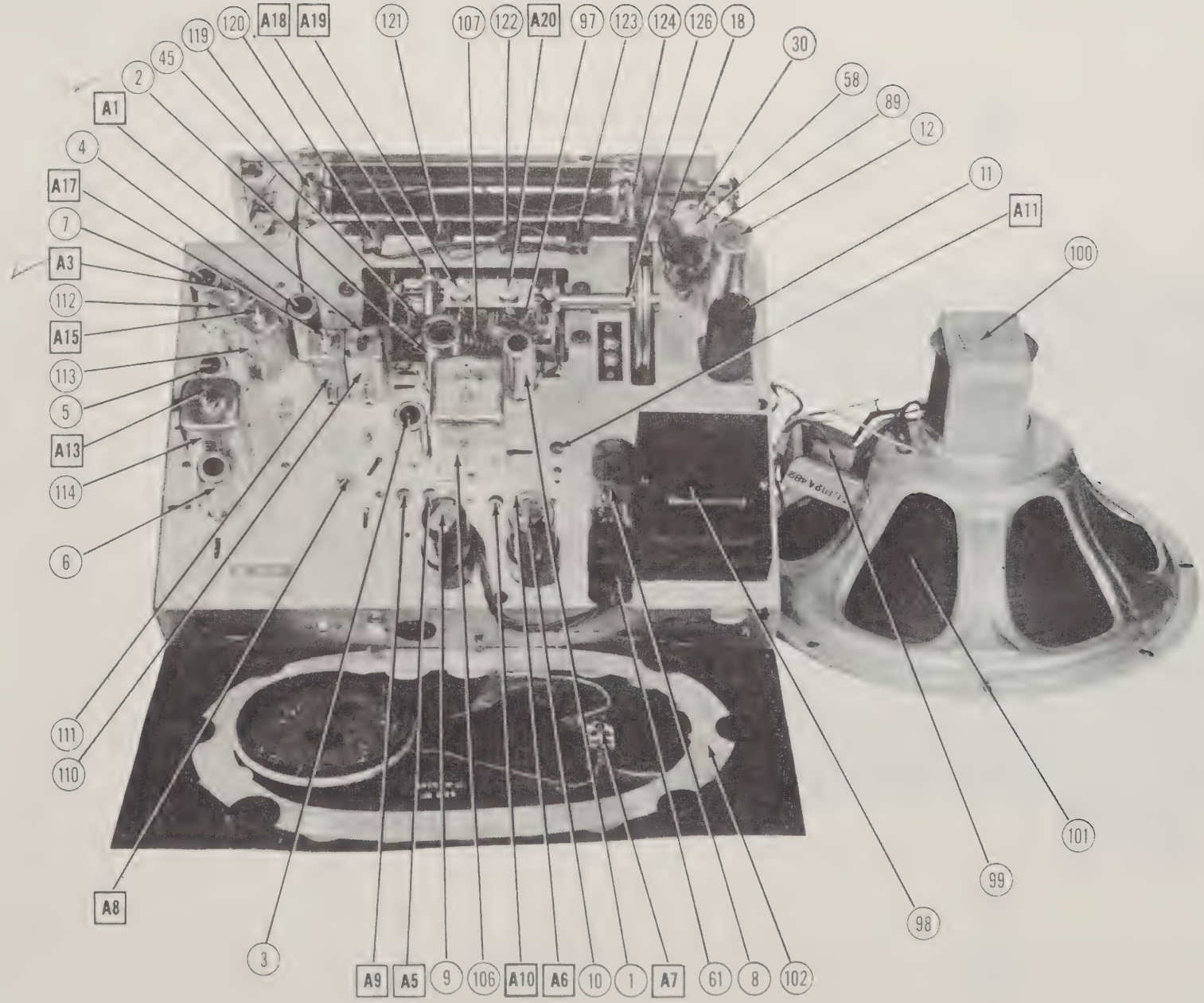
DATE 9/48-#4815-5 SET #45-FOLDER #5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A8
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A6
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A7
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102
98
99
101

AIRLINE MODELS 84WG-2718A, B;
84WG-2720A, 84WG-2724A PAGE 3

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	FM Converter	12AT7	12AT7		
3	AM Converter	6BE6	6BE6	7CH	
4	FM-AM 1st IF Amp.	6BA6	6BA6	7BK	
5	FM 2nd IF Amp.	6BA6	6BA6	7BK	
6	FM Det.	6AL5	6AL5	6BT	
7	AM Det.-AVC-AF	6AV6	6AV6		
8	Tuning Eye	6U5/6G5	6U5/6G5	6R	
9	Power Output	6V6GT	6V6GT	7AC	
10	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
11	20	450	45X351	AF4J	UP2045	DY-20-450	EL-2	Filter
12	40	450	45X302	AF8J	UP4045	DY-40-450	EL-4	"
13	5	100	45X301	PRS150/4	BR415	M-8-150	UT-4	Stabilizing Cap.
14	.5	100	A66504	484-.5	DT2P5	ST-2-5	TC-5	Bias Filter
15	.003	400	D66302	484-003	DT6D3	ST-6-003	TC-23	Output Plate Bypass
16	.006	600	D66602	684-006	DT6D6	ST-6-006	TC-26	Tone Compensation
17	.02	200	B66203	484-02	DT2S2	ST-4-02	TC-12	" "
18	.01	200	B66103	484-01	DT2S1	ST-4-01	TC-11	Audio Coupling
19	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	" "
20	.01	200	B66103	484-01	DT2S1	ST-4-01	TC-11	" "
21	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	1st IF Decoupling
22	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	1st IF Screen Bypass
23	.04	400	D66403	484-04	DT4S4	ST-4-04	TC-14	AM Conv. Decoupling
24	.04	400	D66403	484-04	DT4S4	ST-4-04	TC-14	AM Conv. Screen Bypass
25	.05	200	B66503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
26	.00475	180	45X285					Fixed Padder
27	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	RF Decoupling
28	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	RF Screen Bypass
29A	50		47X112	1468-00005	5W5Q5	MO.5-45	1FM-45	Diode RF Filter
B	50			1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
30	68	300	47X501	1469-00007	5W5Q7	MOS.5-47	MS-47	Tone Compensation-Cer.
31	330	500	47X470	1468-0003	5W5T3	MO.5-33	1FM-33	AF Plate Bypass
32	2700	500	47X482	1467-003	1W5D3	MW.5-23	1FM-23	De-emphasis
33	68	300	47X501					Diode Load Cap.-Note-Cer.
34	68	300	47X501					" " " " " "
35	5000	500	47X507	1467-005	1D5D5	MW.5-25	1FM-25	RF Bypass Pwr. Supply "
36	5000	500	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Decoupling-Cer.
37	5000	500	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Screen Bypass-Cer.
38	5000	500	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Cathode Bypass-Cer.
39	500	300	47X496	1468-0005	5W5T5	MO.5-35	1FM-35	1st IF Cathode Bypass-Cer.
40	47	300	47X498	1468-00005	5W5Q5	MO.5-45	1FM-45	IF Coupling-Cer.
41	5000	500	47X507	1467-005	1D5D5	MW.5-25	1FM-25	RF Bypass Power Supply-Cer.
42	47	300	47X498	1468-00005	5W5Q5	MO.5-45	1FM-45	FM Osc. Grid Cap.-Cer.
43	47	300	47X498	1468-00005	5W5Q5	MO.5-45	1FM-45	FM Osc. Coupling-Cer.
44	47	300	47X499	1468-00005	5W5Q5	MO.5-45	1FM-45	Feedback -Cer.
45	5	300	47X500	1469-000005	5R5V5	MOS.5-55	MS-55	Fixed Trimmer-Cer.
46	20	300	47X516	1468-000025	5W5Q2	MOS.5-42	MS-42	RF Coupling-Cer.
47	100	300	47X497	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.
48	500	300	47X496	1468-0005	5W5T5	MO.5-35	1FM-35	RF Plate Decoup.-Cer.
49	47	300	47X498	1468-00005	5W5Q5	MO.5-45	1FM-45	AM Osc. Grid Cap.-Cer.
50	100	300	47X497	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.
51	20	300	47X516	1468-000025	5W5Q2	MO.5-42	MS-42	" " "
52	500	300	47X496	1468-0005	5W5T5	MO.5-35	1FM-35	RF Screen Bypass-Cer.
53	500	300	47X496	1468-0005	5W5T5	MO.5-35	1FM-35	RF Cathode Bypass-Cer.
54	500	300	47X496	1468-0005	5W5T5	MO.5-35	1FM-35	Filament Bypass-Cer.
55	500	300	47X496	1468-0005	5W5T5	MO.5-35	1FM-35	RF Coupling-Cer.
56	500	300	47X496	1468-0005	5W5T5	MO.5-35	1FM-35	RF Bypass-Cer.
57	270	300	47X445					Fixed Trimmer-Cer.

Note-If either Items 33 or 34 is replaced with a different value, then the other should be replaced with a capacitor of equal value.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: AIRLINE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
100	FIELD RES. 830Ω	VC IMP. 3.5Ω	12A482	ST-744 Mod. F12-S	12E10*	*Replace output transformer to match 6-8Ω voice coil.
101	CONE DIA. 11-3/4"	VC DIA. 1"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIRLINE PART No.	MEISSNER PART No.
102	Loop Ant.	44Ω	1Ω	26A436	
103	FM Di-Pole			9A1960	
104	SW Ant.Coil	1Ω	0Ω	9A1957	
105	FM " "	0Ω	0Ω	9A1945	
106A	BC RF Coil	29Ω	5Ω	9A1947	
B	SW " "		0Ω	9A1947	
107	FM RF Coil		0Ω	9A1946	
108A	BC Osc.Coil	1Ω	5Ω	9A1918	
B	SW " "	0Ω	.1Ω	9A1918	
109	FM " "		0Ω	9A1948	
110	AM 1st IF	15.5Ω	15.1Ω	9A1934	16-6678
111	FM " "	.2Ω	.2Ω	9A1950	
112	AM 2nd IF	14.8Ω	14.8Ω	9A1935	16-6678
113	FM " "	.6Ω	.1Ω	9A1933	
114	FM Disc. Trans.	.9Ω	.1Ω	9A1936	
115	FM Conv. Plate Chk.		.1Ω	9A1880	
116	FM Osc. Plate Chk.		.1Ω	9A1880	
117	FM Osc. Plate Chk.		.3Ω	9A1882	
118	Filament Choke		.5Ω	9A1881	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
119-124	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
125	Switch	2A377	Band-Phono
126	Tuning Gang	26A483	(13-472MMF, 13-472MMF, 24-323MMF)
A5, A9	Trimmer Strip	17A246	BC Osc. Adj. / SW " "
A6, A10	Trimmer Strip	17A252	BC RF Adj. / SW " "
A8	Padder	17A241	BC Osc. Adj.
A11	Trimmer	17A253	SW Ant. Adj.
A18	"	17A255	FM Osc. Adj.
A19	"	17A247	FM RF Adj.
A20	"	17A247	FM Ant. Adj.
	Dial & Drum Assby.	26A484	
	Dial Pointer	15X221	

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	
58A	500KΩ	½	36X363	D13-133X	AT-78	Volume Control tapped @ 100KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 58A per instructions
C	Switch		" "	41	SW-A	" " " " "
59A	3 Meg.	½	40X286	D13-140	AM-67-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 59A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	
60	22KΩ	½	B84223	BTS-22K	Red-Red-Or. SW Ant. Coil Shunt
61	1 Meg.	½	B85105	BTS-1 Meg.	Br.-Blk.-Grn. Tuning Indicator Plate Load
62	1 Meg.	½	B85105	BTS-1 Meg.	Br.-Blk.-Grn. RF Grid
63	68Ω	½	B83680		Blue-Gray-Blk. RF Cathode
64	56KΩ	½	B85563	BTS-56K	Grn.-Blue-Or. RF Screen Dropping
65	22KΩ	1	C85223	BTA-22K	Red-Red-Or. RF Plate Load
66	1000Ω	½	B85102	BTS-1000	Br.-Blk.-Red RF Decoupling
67	6.2Ω	1	43X217	BW-1-6.8	Blue-Red-Gold Series Pilot Light
68	82Ω	½	B84820		Gray-Red-Blk. Parasitic Suppressor
69	2.2 Meg.	½	B85225	BTS-2.2 Meg.	Red-Red-Grn. AM Converter Grid
70	27KΩ	1	C84273	BTA-27K	Red-Vi.-Or. AM Converter Screen Dropping
71	1000Ω	½	B85102	BTS-1000	Br.-Blk.-Red AM Converter Decoupling
72	22KΩ	½	B84223	BTS-22K	Red-Red-Or. AM Oscillator Grid
73	100KΩ	½	B84104	BTS-100K	Br.-Blk.-Yl. FM Converter Grid
74	10KΩ	½	B84103	BTS-10K	Br.-Blk.-Or. FM Oscillator Grid
75	2.2 Meg.	½	B85225	BTS-2.2 Meg.	Red-Red-Grn. 1st IF Grid
76	68Ω	½	B83680		Blue-Gray-Blk. 1st IF Cathode
77	56KΩ	1	C84563	BTS-56K	Grn.-Blue-Or. 1st IF Screen Dropping
78	1000Ω	½	B85102	BTS-1000	Br.-Blk.-Red 1st IF Decoupling
79	68Ω	½	B83680		Blue-Gray-Blk. 2nd IF Cathode
80	39KΩ	1	C84393	BTA-39K	Or.-White-Or. 2nd IF Screen Dropping
81	2200Ω	½	B85222	BTS-2200	Red-Red-Red 2nd IF Plate Decoupling
82	6800Ω	½	B83682	BTS-6800	Blue-Gray-Red Ratio Detector Diode Load
83	6800Ω	½	B83682	BTS-6800	Blue-Gray-Red " " " "
84	1 Meg.	½	B85105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
85	27KΩ	½	B84273	BTS-27K	Red-Vi.-Or. De-emphasis
86	4.7 Meg.	½	B85475	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
87	220KΩ	½	B85224	BTS-220K	Red-Red-Yl. AF Plate Load
88	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. Series Phono
89	15KΩ	½	B85153	BTS-15K	Br.-Grn.-Or. Tone Compensation
90	1 Meg.	½	B85105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
91	47KΩ	½	B85473	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
92	2.2 Meg.	½	B85225	BTS-2.2 Meg.	Red-Red-Grn. Bias Network
93	2.2 Meg.	½	B85225	BTS-2.2 Meg.	Red-Red-Grn. " "
94	220KΩ	½	B85224	BTS-220K	Red-Red-Yl. Output Grid
95	510KΩ	½	B83514	BTS-470K	Grn.-Br.-Yl. Bias Network
96	91KΩ	½	B83913	BTS-100K	White-Br.-Or. " "
97	2200Ω	½	B85222	BTS-2200	Red-Red-Red FM Ant. Coil Shunt

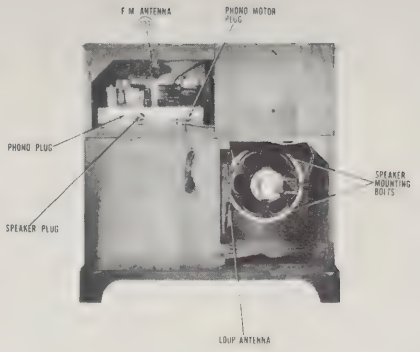
TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	AIRLINE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
98	117V AC @ .73A	650VCT .96A DC	5.2VAC @ 2.0A	6.5 V AC @ 3.2A	53X286	P-6013	T22R06	P-2953†

†Add series resistor to reduce plate voltage.

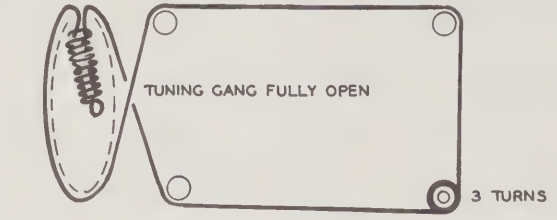
TRANSFORMER (OUTPUT)

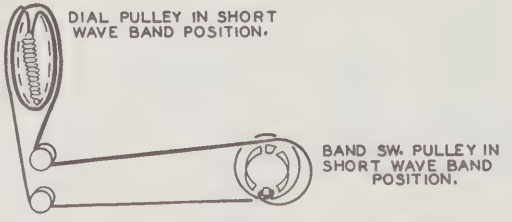
ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIRLINE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
99	6000Ω	3.5Ω	540Ω	.6Ω	Part of 12A432	A-3824	T22S58	A-2902	



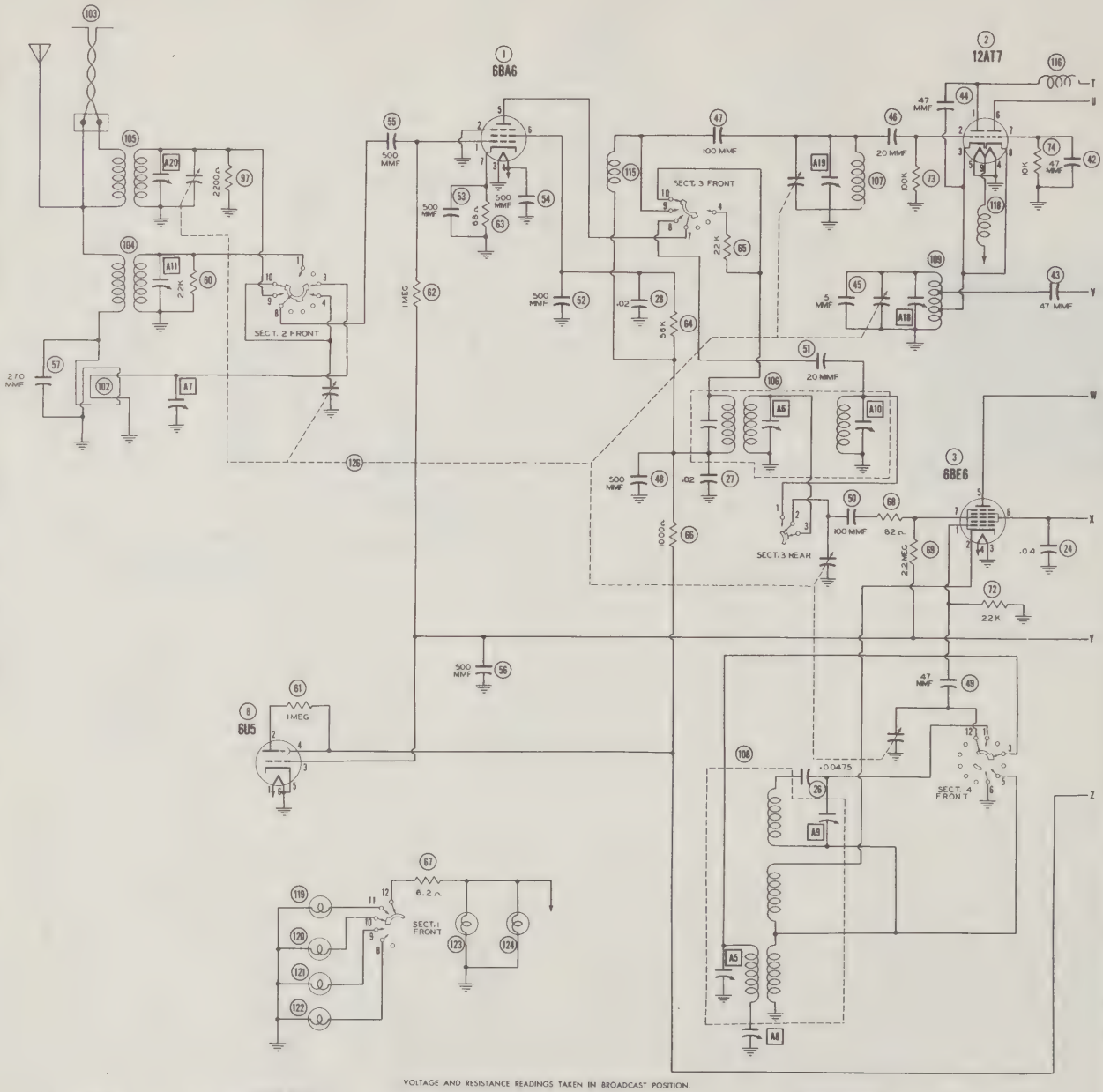
DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove phono-motor, phono-pickup and speaker plugs from chassis.
3. Remove loop leads from loop antenna.
4. Remove tuning eye from tuning eye bracket.
5. Remove three bolts from chassis.
6. Remove FM antenna lead from terminal strip on chassis.
7. Remove two wood screws holding rubber mounts at rear of chassis and remove chassis.
8. Remove three wood screws from lower left hand corner of panel covering rear of phono compartment. Pull out on corner so that speaker plug may be pulled through opening.
9. Remove staples holding loop antenna in cabinet. Remove loop from cabinet.
10. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.





DATE 5/48-#4815-5 SET #45-FOLDER #5



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6BA6	-.1VDC	0V.	0V.	6.3VAC	250VDC	7.1VDC	1.1VDC	-	-
‡ 2	12AT7	0 VDC	-.1VDC	0V.	0V.	0 V	0 VDC	-.1 VDC	0V.	6.3VAC
3	6BE6	-2.8VDC	0V.	0V.	6.3VAC	240VDC	0 VDC	0V.	-	-
4	6BA6	-.1VDC	0V.	0V.	6.3VAC	245VDC	7.1VDC	.7VDC	-	-
‡ 5	6BA6	0V.	0V.	0V.	6.3VAC	250VDC	98VDC	1VDC	-	-
‡ 6	6AL5	0V.	0V.	0V.	6.3VAC	.1VDC	0V.	-.1VDC	-	-
7	6AV6	-.1VDC	0V.	0V.	6.3VAC	0V.	-.3VDC	100VDC	-	-
9	6V6GT	0V.	0V.	0VAC	225VDC	245VDC	-5.4VDC	-10VDC	0V.	0V.
10	5Y3GT	0V.	0V.	0V.	325VAC	0V.	325VAC	0V.	245VDC	-

‡TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6BA6	2.5 Meg.	0Ω	0Ω	.1Ω	90KΩ	1.1MΩ	68K	-	-
‡ 2	12AT7	90KΩ	100KΩ	0Ω	0Ω	0Ω	10KΩ	10KΩ	0Ω	0Ω
3	6BE6	.02KΩ	1Ω	0Ω	.1Ω	90KΩ	120KΩ	3.7 Meg.	-	-
4	6BA6	3.7 Meg.	0Ω	0Ω	.1Ω	90KΩ	150KΩ	68Ω	-	-
‡ 5	6BA6	.1Ω	0Ω	0Ω	.1Ω	95KΩ	130KΩ	68Ω	-	-
‡ 6	6AL5	INF.	INF.	0Ω	.1Ω	6.8KΩ	INF.	0.5MΩ	-	-
7	6AV6	4.7 Meg.	0Ω	0Ω	.1Ω	0Ω	550KΩ	330KΩ	-	-
9	6V6GT	INF.	.1Ω	50KΩ	10KΩ	310KΩ	0KΩ	0Ω	0Ω	-
10	5Y3GT	INF.	90KΩ	INF.	45KΩ	INF.	90Ω	INF.	90KΩ	-

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS. THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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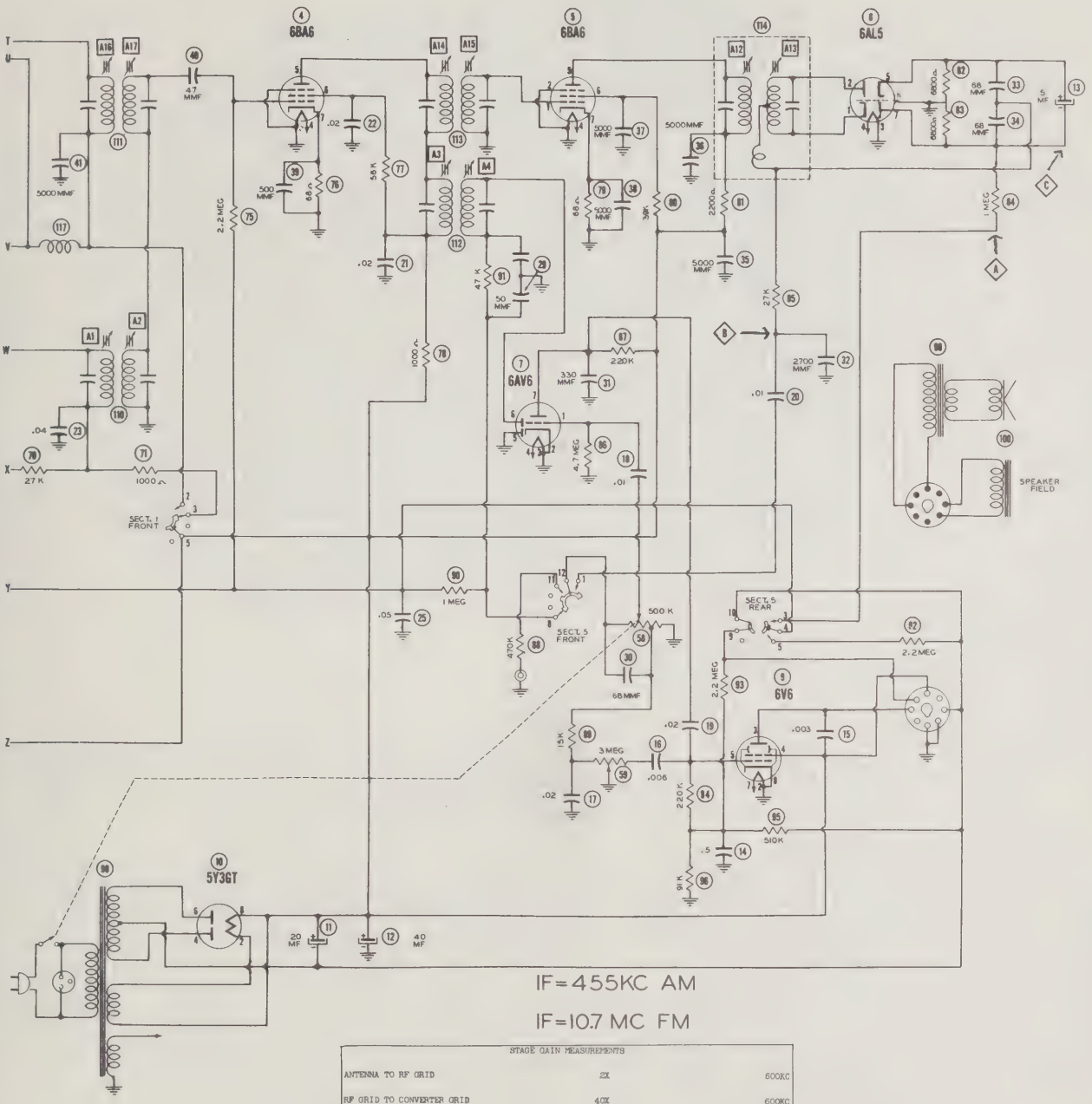

STAGE GAIN MEASUREMENTS		
ANTENNA TO RF GRID	2X	600KC
RF GRID TO CONVERTER GRID	40X	600KC
CONVERTER GAIN	10X	IN 600KC OUT 455KC
INPUT IF TRANS.	.9X	455KC
IF TUBE	180X	455KC
OUTPUT IF TRANS.	1X	455KC
AUDIO	40X	400 ∿
OUTPUT	22X	400 ∿

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	455KC	BC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output
2	200MMFD	High side to ext. antenna lead. Low side to chassis.	1620KC	"	"	"	A5	" " " "
3	200MMFD	"	1400KC	"	Tuning for maximum output.	"		Set pointer to 1400KC dial calibration mark.
4	200MMFD	"	"	"	"	"	A6,A7	Adjust for maximum output
5	200MMFD	"	600KC	"	"	"	A8	Rock tuning cap. and adjust for maximum output. Repeat Steps 2, 3, 4 and 5 until no further improvement can be made.
6	400Ω carbon res.	"	18.3MC	SW	Tuning cap. fully open.	"	A9	Adjust for maximum output
7	"	"	17MC	"	Tune for max. output.	"	A10, A11	Rock tuning cap. and adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8	.01 MFD	High side to Pin 1 (grid) of 6BA6 2nd IF Tube (5). Low side to chassis.	10.7MC (Unmodulated)	FM	Tuning cap. fully open.	DC probe to Point (A). Common to chassis	A12	Adjust for maximum deflection.
9	.01 MFD	"	"	"	"	DC probe to Point (B). Common to chassis	A13	Adjust for zero deflection. Repeat Steps 9 & 10 until no further improvement can be made.
10	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (4). Low side to chassis.	"	"	"	DC probe to Point (A). Common to chassis	A14	Shunt 5000Ω resistor across secondary of 2nd IF Transformer (113). Adjust A14 for maximum deflection.
11	.01 MFD	"	"	"	"	"	A15	Transfer resistor of Step 10 to primary of the same transformer. Adjust A15 for maximum deflection. Remove 5KΩ resistor.
12	.01 MFD	High side to left FM stator of tuning cap. Low side to chassis.	"	"	"	"	A16, A17	Adjust for maximum deflection. Continue with FM-RF alignment in Step 13.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep.
Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
8	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (4). Low side to chassis.	10.7 MC (Freq. Mod.)	FM	Tuning cap. fully open.	Vertical input to Point (C). Ground to chassis.	A12, A14, A15	Disconnect 5 MFD cap. from Point (C). Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
9	.01 MFD	High side to left FM stator of tuning cap. Low side to chassis.	"	"	"	"	A16, A17	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1. Replace 5 MFD cap. to Point (C).
10	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (4). Low side to chassis.	"	"	"	Vertical input to Point (B). Ground to chassis.	A13	Adjust for maximum straightness of cross-over lines with cross-over occurring at center of pattern per Fig. 2. Continue with FM-RF Alignment in Step 13.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
13	300Ω carbon res.	High side to either FM ant. terminal. Low side to chassis.	108.4MC	FM	Tuning cap. fully open.	DC probe to Point (A). Common to chassis	A18	Adjust for maximum deflection. Tune sig. gen. to 87MC. If meter deflection is not noted retune sig. gen. to 108.4MC and close A18 to next peak. Adjust for maximum deflection and recheck for image.
14	"	"	104.5MC	"	Tune for maximum deflection.	"	A19, A20	Adjust for maximum deflection. Install chassis in cabinet.
						OUTPUT METER		
15	200MMFD	High side to ext. ant. lead. Low side to chassis.	1400KC	BC	Tune for maximum output.	Across voice coil	A7	Adjust for maximum output

FIG. 1

FIG. 2

CONCORD MODELS
1-402, 1-403

CONCORD MODELS
1-402, 1-403

CONCORD MODEL 1-403

TRADE NAME	Concord, Model 1-402, 1-403
SUPPLIER	Concord Radio Corp., 901-11 W. Jackson Blvd., Chicago 7, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 12SA7GT Converter, 12SQ7GT Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1710KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect .1 MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 12SA7. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	200 MMFD	High side to ext. ant. lead. Low side to chassis.	1400KC	1400KC	"	A3	Adjust for maximum output.
3	200 MMFD	"	"	Tune for maximum output.	"	A4	" " " "

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DATE 9/48-#4815-6 SET #45-FOLDER #6

PARTS LIST AND DESCRIPTIONS

CONCORD MODELS 1-402, 1-403

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CONCORD PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	8AD	
2	Det.-AVC-AF	12SQ7GT	12SQ7GT	6Q	
3	Power Output	50L6GT	50L6GT	7AC	
4	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CONCORD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	50	150		PRSA150/50-50	E25515	DSB-2x50-150	TA-505	Filter
B	50	150						"
6	.05	400		484-05	DT4S5	MPH-4-05	TC-15	Line Filter
7	.0068	300		484-.0075	DT6D6	ST-6-006	TC-26	Output Plate Bypass
8	.0068	300		484-.0075	DT6D6	ST-6-006	TC-26	Audio Coupling
9	.01	400		484-.01	DT4S1	ST-4-01	TC-11	" "
10	.05	400		484-.05	DT4S5	ST-4-05	TC-15	AVC Filter
11	.1	200		484-.1	DT4P1	ST-4-1	72P2	Ant. Isolation
12	500	300		1468-.0005	5W5T5	MO.5-35	1FM-35	AF Plate Bypass
13	220	500		1468-.0002	5W5T2	MO.5-32	1FM-32	Diode RF Filter

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CONCORD PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
14A	1 Meg.	½		D13-137	AM-63-Z	Volume Control
B	Shaft			E	KSS-3	Attach to 14A per instructions
C	Switch			41	SW-A	" " " " "

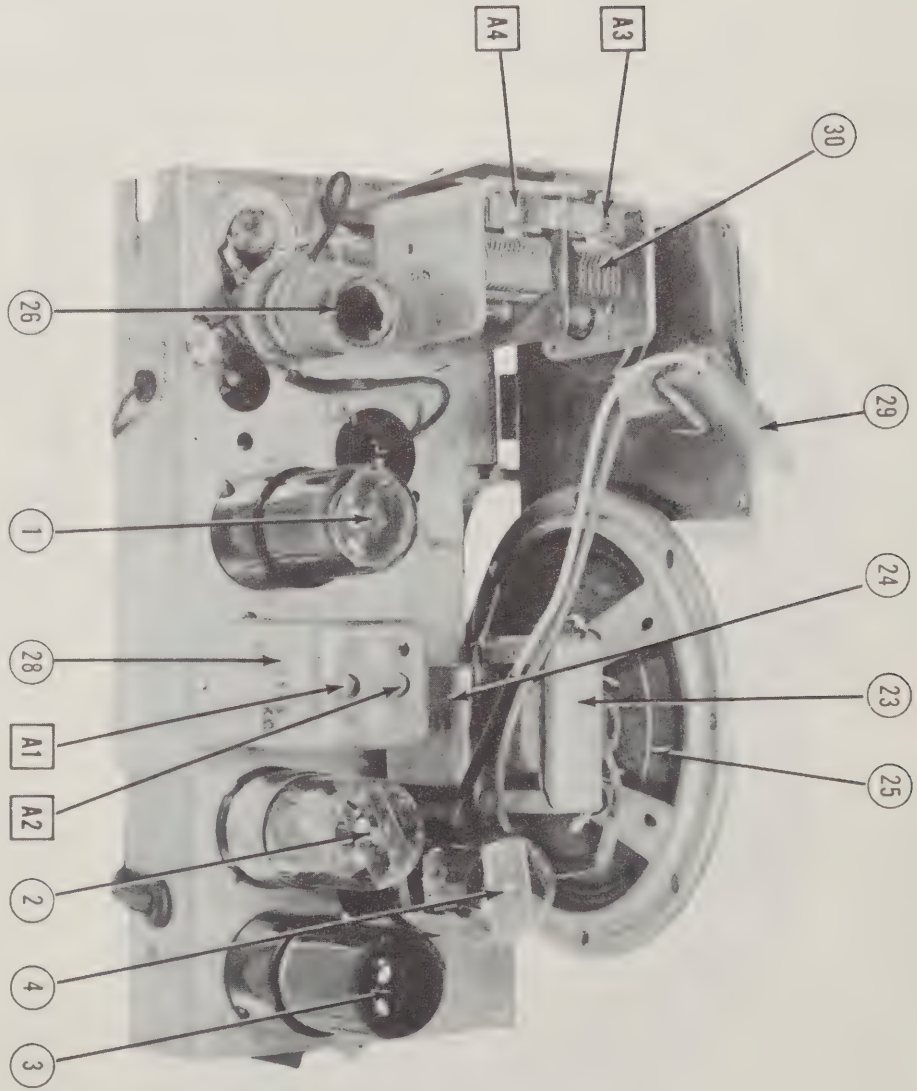
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CONCORD PART No.	IRC PART No.	IDENTIFICATION CODES
15	8200Ω	½		BTS-8200	Gray-Red-Red Oscillator Grid
16	3 Meg.	½		BTS-3.3 Meg.	Or.-Blk.-Grn. AVC Network
17	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue AF Grid
18	220KΩ	1		BTA-220K	Red-Red-Yl. AF Plate Load
19	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. Output Grid
20	1200Ω	1		BTA-1200	Br.-Red-Red Filter
21	18Ω	½		BW-½-18	Br.-Gray-Blk. Surge Limiter
22	75Ω	5		AB-75	Line Dropping

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: CONCORD PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
23	13000Ω	3.2Ω	136Ω	.4Ω	21223	A-3865#	T22S45#	A-2028#	#Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: CONCORD PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
24	FIELD PM	VC IMP. 3.2Ω		ST-105 Mod. P5-X	5A15	
25	CONE DIA. 4-3/4"	VC DIA. 1/2"				

R F COILS

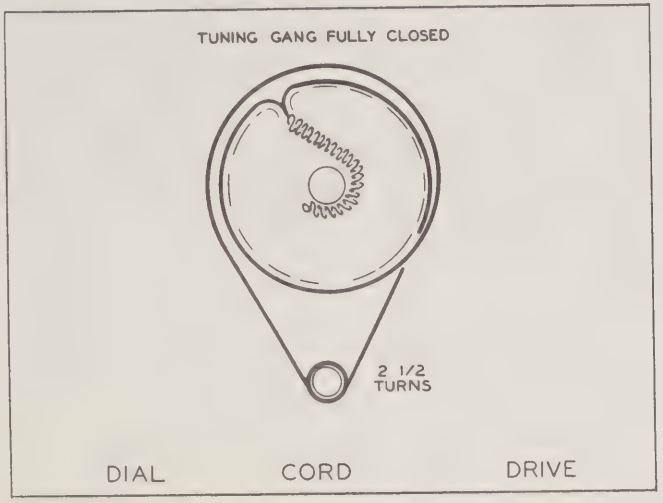
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CONCORD PART No.	MEISSNER PART No.	
26	Ant. Coil	3Ω.7Ω	4.1Ω		14-1056	
27	Osc. Coil		6.8Ω		14-1060†	†Add 50 MMFD from high side of tuning cap. to oscillator grid.
28	IF Trans.	24.5Ω	24.3Ω		16-6660	

DIAL LIGHT

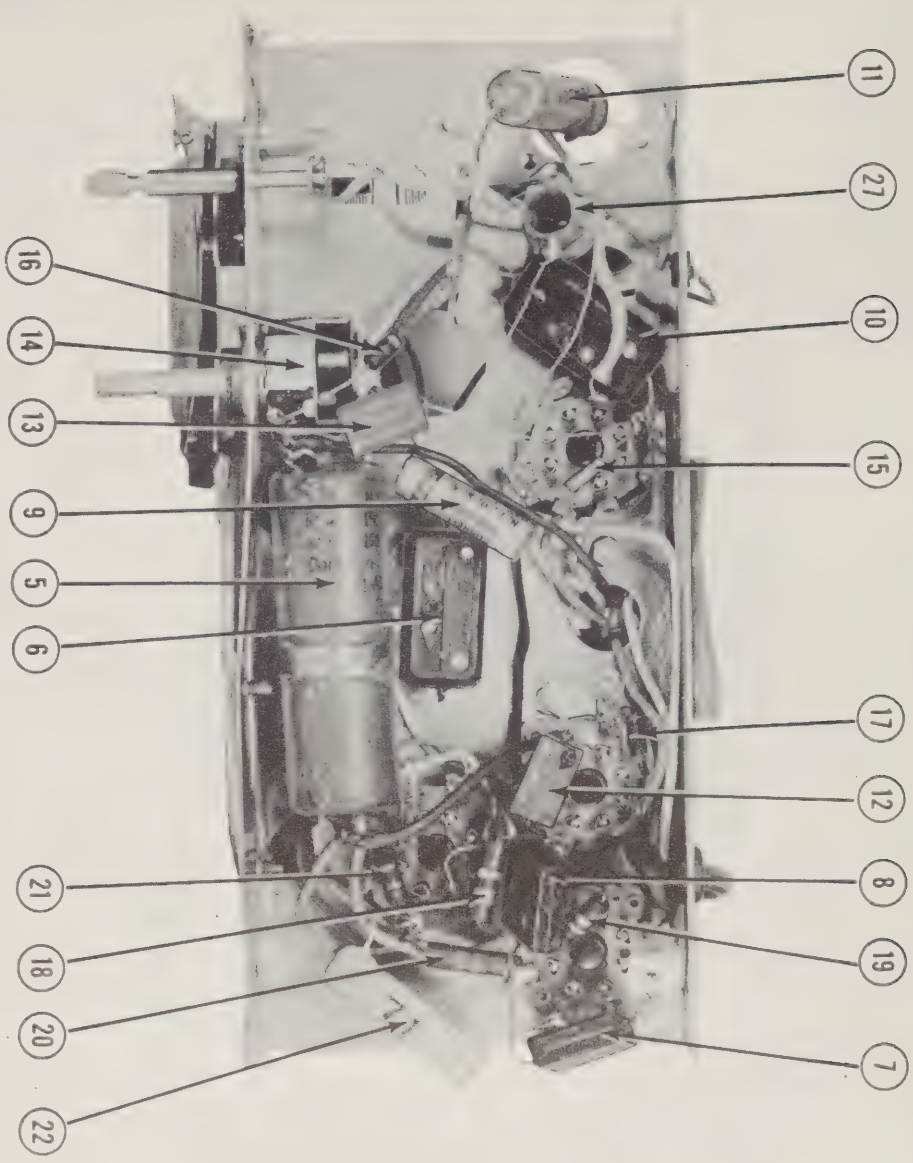
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: CONCORD PART No.		INSTALLATION NOTES
29	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

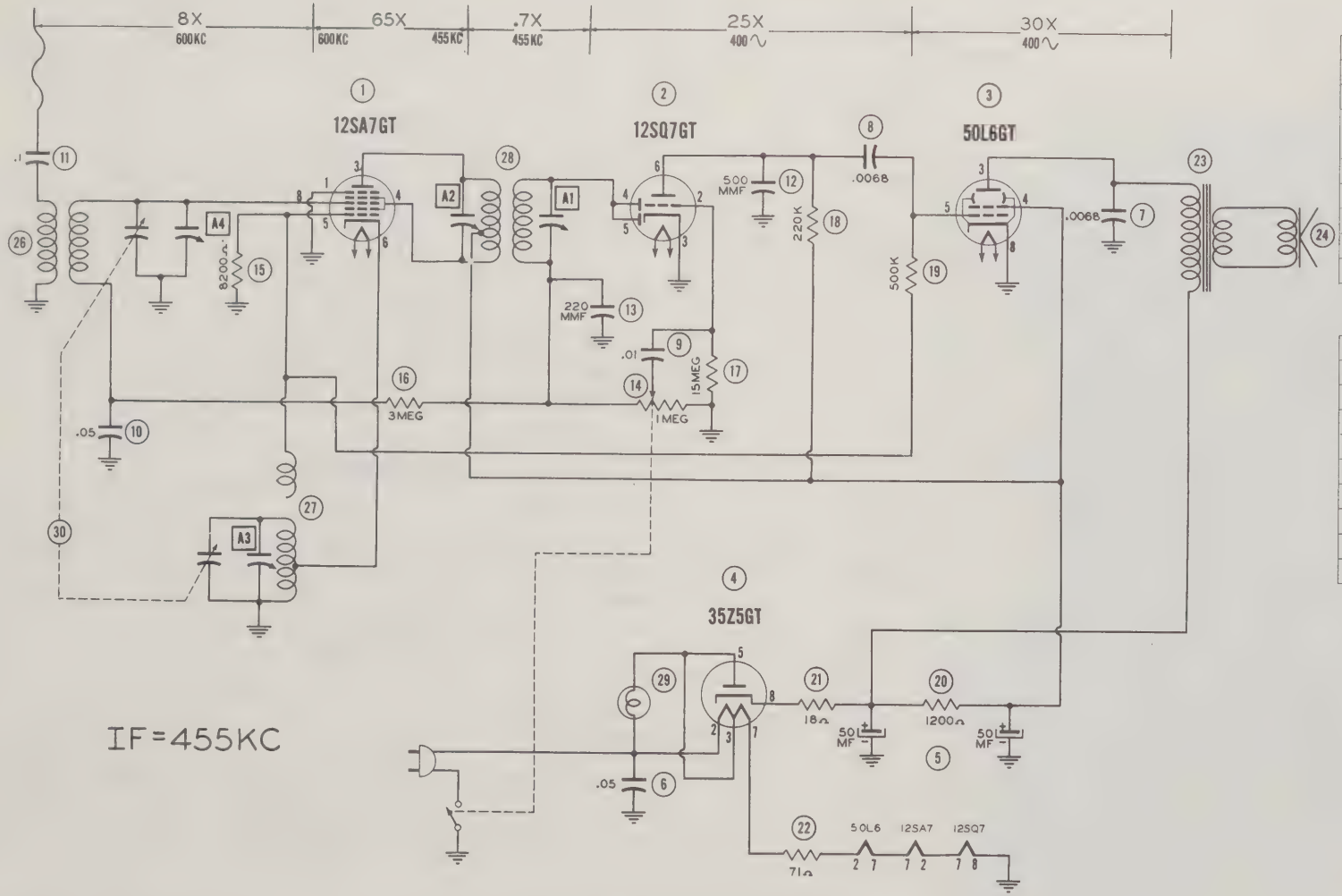
ITEM No.	PART NAME	CONCORD PART No.	NOTES
30	2 Gang Var. Cap		(50-485MMF, 35-192MMF)



CHASSIS—BOTTOM VIEW



CONCORD MODELS 1-402, 1-403



VOLTAGE AND RESISTANCE READINGS

Pin	12SA7GT		12SQ7GT	
No.	Volt.	Res.	Volt.	Res.
1	0V.	0Ω	0V.	0Ω
2	12VAC	13Ω	-.8VDC	15 Meg.
3	80VDC	100KΩ	0V.	0Ω
4	80VDC	100KΩ	-.7VDC	1 Meg.
5	-3.4VDC§	8.2KΩ	-.7VDC	1 Meg.
6	0V.	1Ω	60VDC	32KΩ
7	24VAC	26Ω	12VAC	13Ω
8	-.8VDC	4 Meg.	0V.	0Ω

Pin	50L6GT		12SQ7GT	
No.	Volt.	Res.	Volt.	Res.
1	0V.	INF.	0V.	0Ω
2	75VAC	75Ω	-.8VDC	15 Meg.
3	85VDC	100KΩ	0V.	0Ω
4	80VDC	100KΩ	-.7VDC	1 Meg.
5	-.8VDC	500KΩ	-.7VDC	1 Meg.
6	-2VDC	8.2KΩ	60VDC	32KΩ
7	24VAC	26Ω	12VAC	13Ω
8	0V.	0Ω	0V.	0Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

4815-6

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

CONCORD MODEL
1-606

CONCORD MODEL 1-606

TRADE NAME	Concord, Model 1-606
SUPPLIER	Concord Radio Corp., 901-11 W. Jackson Blvd., Chicago 7, Ill.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 14F8 FM Det., 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 35B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	105-125 Volts AC — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1700KC — FREQ. MOD. 88 - 108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning cap. fully closed and set pointer 1-11/16" from left edge of dial backplate. This is the calibration mark referred to in Steps below.
Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to Pin 7 (grid) of 12BE6. Low side to B-.	455KC	AM (Counter-clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001 MFD. to reduce hum modulation.
2	200 MMFD	High side to ext. ant. lead. Low side to B-.	1500KC	"	4-1/16" from calibration mark.	"	A5	Adjust for maximum output
3	200 MMFD	"	"	"	Tune for max-imum output.	"	A6	" " " "
4	Direct	High side to FM ant. terminal. Low side to chassis.	21.75MC (400KC AM)	FM (Clock-wise)	Tuning cap. fully open.	"	A7	" " " "
5	"	"	88MC	"	1/4" from calibration mark.	"	FM Osc. Coil (68)	Spread or compress FM Osc. Coil slightly for maximum output.
6	"	"	108MC	"	4-9/16" from calibration mark.	"	A8	Adjust for maximum output Repeat Steps 5 & 6 until no further improvement can be made.
7	"	"	90MC	"	Tune for max-imum output.	"	FM Ant. Coil (66)	Rock tuning cap. and ex-pand or compress FM ant. coil slightly for maxi-mum output.
8	"	"	108MC	"	"	"	A9	Adjust for maximum out-put. Repeat Steps 7 & 8 until no further improve-ment can be made.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		CONCORD PART No.	STANDARD REPLACEMENT		
1	FM Det.	14F8	14F8	8BW	
2	Converter	12BE6	12BE6	7CH	
3	IF Amp.	12BA6	12BA6	7BK	
4	Det.-AVC-AF	12AT6	12AT6	7BT	
5	Power Output	35B5	35B5	7BZ	
6	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

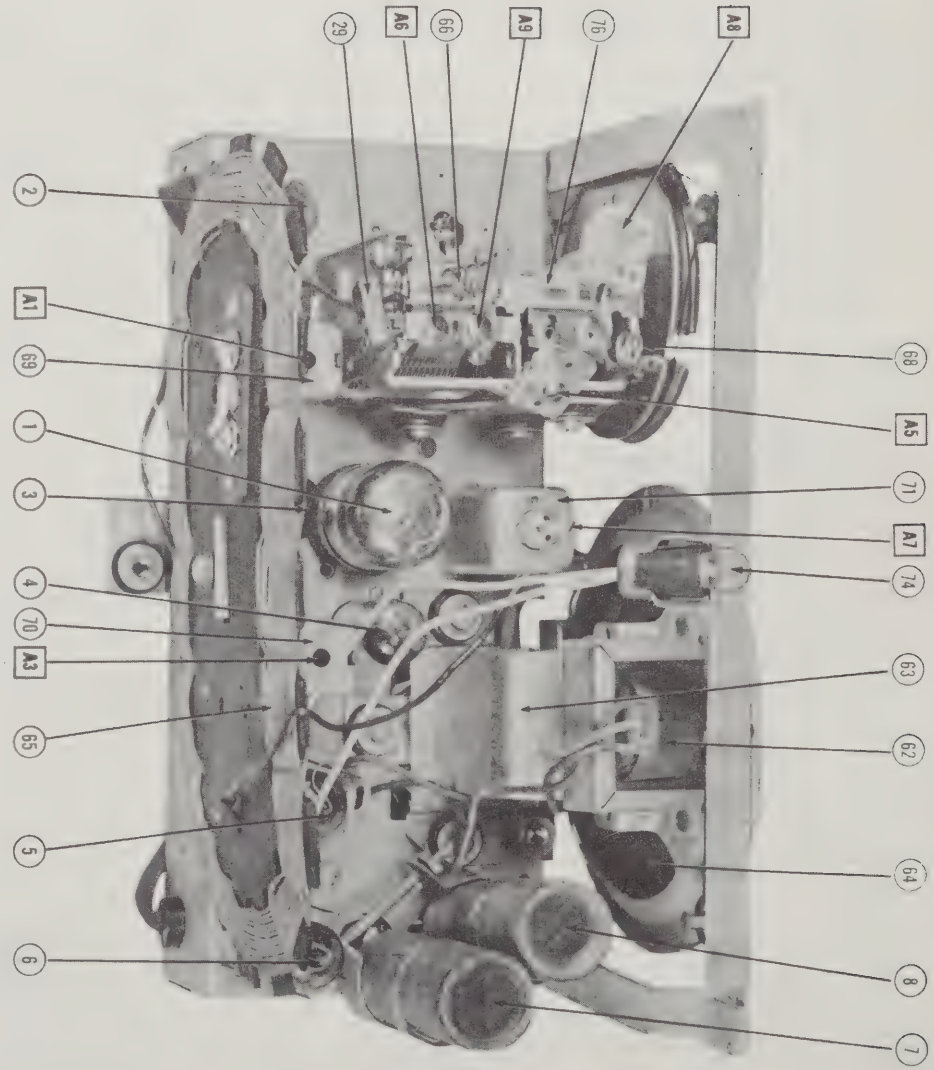
ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	CONCORD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
7	80	150		PRSA-150/40-40*	BR8015	*DSB-2x40-150	TA440*	Filter-Yellow-Red
8A	40	150		PRSA40302	EDL5315C	DSB 303	TA440	Filter-Red
B	40	150					TA-25	-Yellow
C	20	25						-Green
9	10	25		PRS25/10	BR102A	M-10-25	TA-10	Stabilizing Cap.
10	.01	400		484-.01	DT4S1	ST-4-01	TC-11	Line Filter
11	.002	600		684-.002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
12	.02	200		484-.02	DT2S2	ST-4-02	TC-12	Audio Coupling
13	.01	400		484-.01	DT4S1	ST-4-01	TC-11	" "
14	.02	200		484-.02	DT2S2	ST-4-02	TC-12	" "
15	.01	100		484-.01	DT1S1	ST-4-01	TC-11	Conv. Decoupling
16	.05	200		484-.05	DT2S5	ST-4-05	TC-15	AVC Bypass
17	.1	400		484-.1	DT4P1	ST-4-01	TC-11	RF Bypass Pwr. Supply
18	.2	200		484-.2	DT4P2	ST-4-2	TC-2	Line Isolation
19	.005	400		484-.005	DT4D5	ST-4-005	TC-25	RF Bypass
20	250	500		1468-.00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
21	100	300		1468-.0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.
22	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
23	50	500		1469-.00005	5R5Q5	MOS.5-45	MS-45	Osc. Grid Cap.
24	15	300					MS-415	Fixed Trimmer-Cer.
25	500	300		1468-.0005	5W5T5	MO.5-35	1FM-35	RF Bypass-Cer.
26	1000	500		1468-.001	1W5D1	MW.5-21	1FM-21	De-emphasis
27	4300	500		1467-.005	1D5D5	MW.5-25	1FM-25	RF Bypass
28	4300	300		1467-.005	1D5D5	MW.5-25	1FM-25	RF Bypass
29	500	500		1469-.0005	5W5T5	MOS.5-35	MS-35	Fixed Padder
30	3200	500						Quench Network
31	25	500		1469-.000025	5R5Q25	MOS.5-425	MS-425	Osc. Grid Cap.
32	500	300		1468-.0005	5W5T5	MO.5-35	1FM-35	RF Bypass-Cer.
33	2	300						Osc. Coupling-Cer.
34	2	300						Ant. Coupling-Cer.
35	500	300		1468-0005	5W5T5	MO.5-35	1FM-35	Osc. Feedback-Cer.
36	30	500			5W5Q3	MO.5-43	1FM-43	Regenerative Feedback-Cer.
37	30	500		1468-.000025	5W5Q3	MO.5-43	1FM-43	" " "
38	500	300		1468-.0005	5W5T5	MO.5-35	1FM-35	Rectifier Bypass-Cer.
39	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Line Ant. Coupling
40	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Filament Bypass

*Parallel sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	CONCORD PART No.	IRC PART No.	CLAROSTAT PART No.	
41A	500KΩ	½		D13-133	M-60-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 41A per instructions
C	Switch			41	SW-A	" " " " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CONCORD PART No.	IRC PART No.	
42	22KΩ	½		BTS-22K	Red-Red-Or. Osc. Grid
43	470Ω	½		BTS-470	Yl.-Vi.-Br. Conv. Decoup.
44	2 Meg.	½		BTS-2 Meg.	Red-Blk.-Grn. AVC Network
45	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode Filter
46	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
47	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate
48	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
49	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
50	15KΩ	½		BTS-15K	Br.-Grn.-Or. FM IF Transformer Shunt
51	150KΩ	½		BTS-150K	Br.-Grn.-Yl. Voltage Dropping
52	1500Ω	½		BTS-1500	Br.-Grn.-Red Quench Network
53	100KΩ	½		BTS-100K	Br.-Blk.-Yl. De-emphasis
54	22KΩ	½		BTS-22K	Red-Red-Or. Conv. Cathode
55	120Ω	½			Br.-Red-Br. FM Osc. Decoup.
56	22KΩ	½		BTS-22K	Red-Red-Or. FM Osc. Grid
57	1200Ω	½		BTS-1200	Br.-Red-Red Decoup.
58	820Ω	1		BTA-820	Gray-Red-Br. Filter
59	220KΩ	½		BTS-220K	Red-Red-Yl. Line Isolation
60	1000Ω	½		BTS-1000	Br.-Blk.-Red IF Cathode
61	1200Ω	½		BTS-1200	Br.-Red-Red Bleeder

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		CONCORD PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
62	5000Ω	3.2Ω	360Ω	.4Ω	Part of LSA11.046	A-3877	T22S46	A-2930	

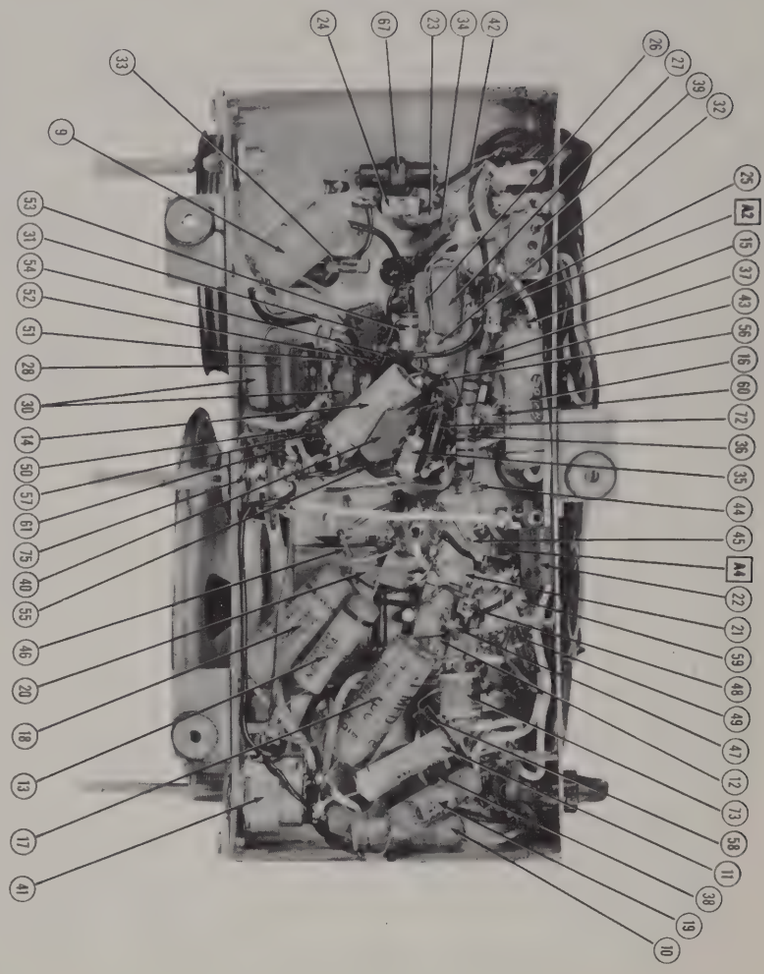
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			CONCORD PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-105♯		
63	PM	3.2Ω	LSA11.046	Mod. P5-X	5A15♯	♯Drill and tap magnet frame.
	CONE DIA.	VC DIA.				
64	4-5/8"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	CONCORD PART No.	MEISSNER PART No.	
65	Loop Ant.	0Ω	1.2Ω			
66	FM Ant.Coil		0Ω			
67	BC Osc. "		5.8Ω		14-1060†	†Add 50 MMFD from high side of tuning cap. to osc. grid.
68	FM " "		0Ω			
69	AM Input IF	16Ω	16.2Ω		16-6678	
70	AM Output IF	16Ω	15.8Ω		16-6678	
71	FM IF	3.3Ω	.4Ω			
72	FM RF Choke		1.2Ω			
73A	Line Choke		CΩ			
B	" "		0Ω			

CHASSIS—BOTTOM VIEW



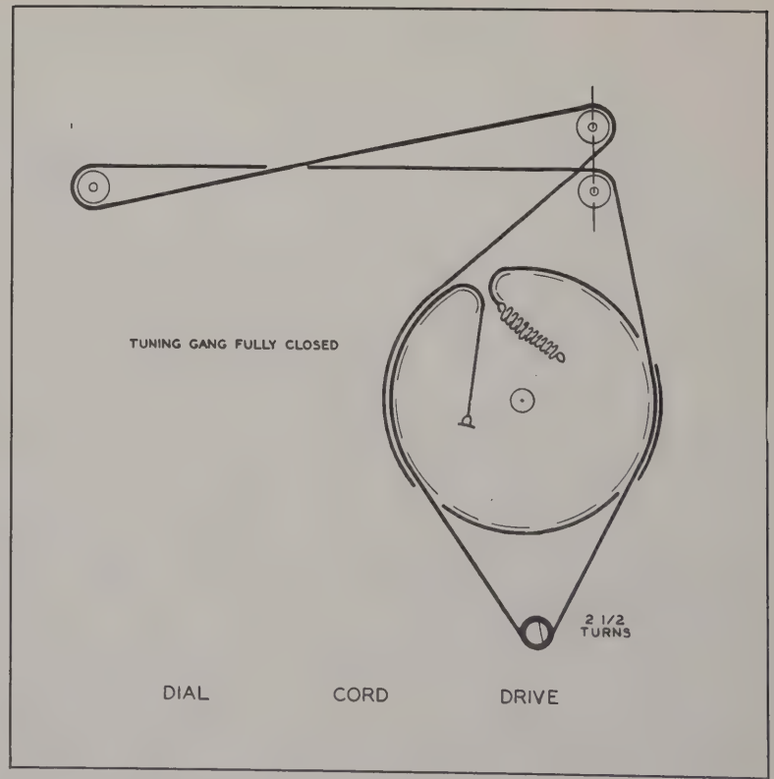
PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					CONCORD PART No.		
74	Bayonet	7.5	0.2	White			Type 51

MISCELLANEOUS

ITEM No.	PART NAME	CONCORD PART No.	NOTES
75	Switch		Band
76	Tuning Gang		(20-215 MMF, 20-200MMF)



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	14F8	60VDC	0V.	115VDC	65VDC	0V.	120VDC	11VAC	-1VDC§
2	12BE6	-9.6VDC§	0V.	25VAC	40VAC	105VDC	105VDC	-.2VDC	-
3	12BA6	-.4VDC	0V.	40VAC	55VAC	110VDC	110VDC	2VDC	-
4	12AT6	-.4VDC	0V.	11VAC	25VAC	-.4VDC	-.4VDC	60VDC	-
5	35B5	0V.	6.2VDC	55VAC	85VAC	115VDC	110VDC	0V.	-
6	35W4	0V.	0V.	85VAC	117VAC	115VAC	115VAC	135VDC	-

RESISTANCE READINGS

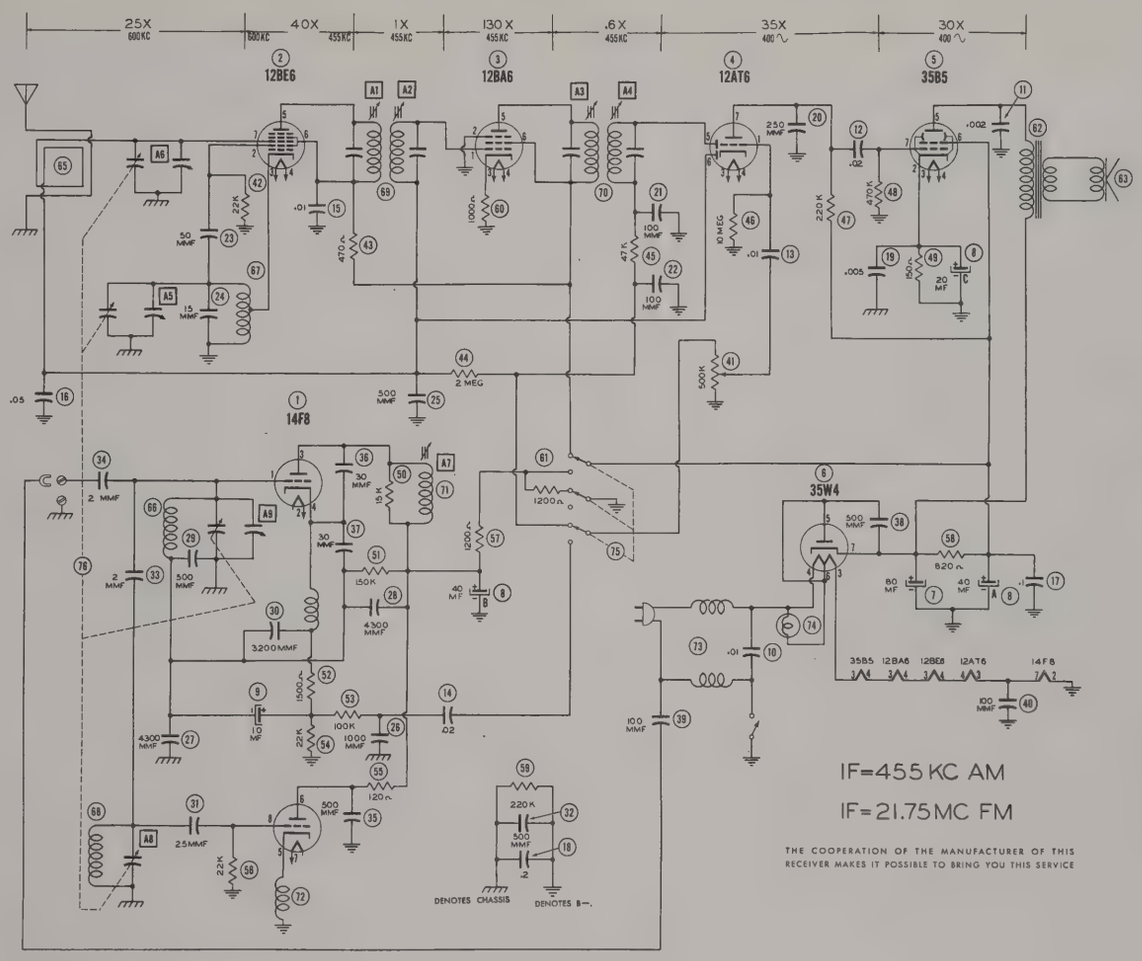
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	14F8	180KΩ	0Ω	31KΩ	24KΩ	1.2Ω	31KΩ	12Ω	22KΩ
2	12BE6	22KΩ	0Ω	24Ω	30Ω	30KΩ	30KΩ	2.7 Meg.	-
3	12BA6	2.7 Meg.	1KΩ	36Ω	48Ω	30KΩ	30KΩ	1KΩ	-
4	12AT6	10 Meg.	0Ω	12Ω	24Ω	2.7 Meg.	550KΩ	250KΩ	-
5	35B5	470KΩ	150Ω	48Ω	80Ω	30KΩ	30KΩ	470KΩ	-
6	35W4	INF.	INF.	80Ω	110Ω	105Ω	105Ω	30KΩ	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4815-7

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

DATE 5/48-4815-7 SER #45-FOLDER #7

DEWALD MODEL B402
BATTERY OPERATED

DEWALD MODEL B402
BATTERY OPERATED

DEWALD MODEL B402

TRADE NAME	Dewald, Model B402
MANUFACTURER	Dewald Radio Mfg. Corp., 35-28 49th St., Long Island City, N.Y.
TYPE SET	Battery Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1U5 Det.-AVC-AF, 3V4 Power Output.
POWER SUPPLY RATING	4.5 Volts "A" Supply and 67.5 Volts "B" Supply 94MA @ 4.5 Volts DC and 8 MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1700KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1		Loop	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Fashion loop of several turns of wire and radiate signal into loop of receiver.
2		"	1700KC	"	"	A5	Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	" " " "

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DATE 9/48-#4815-8 SET #45-FOLDER #4815-8

PARTS LIST AND DESCRIPTIONS

DEWALD MODEL B402

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		DEWALD PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1U5	1U5	6BW	
4	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	DEWALD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5	20	200		PRS150/20	BR215	M-20-150	UT201	Filter
6	.001	600		684-.001	DT6B1	ST-6-001	TC-21	Output Plate Bypass
7	.01	200		424-.01	DT2S1	ST-4-01	TC-11	Audio Coupling
8	.01	200		424-.01	DT2S1	ST-4-01	TC-11	Audio Screen Bypass
9	.001	600		684-.001	DT6D1	ST-6-001	TC-21	Audio Coupling
10	.05	400		434-.05	DT4S5	ST-4-05	TC-15	RF Bypass Power Supply
11	.05	400		434-.05	DT4S5	ST-4-05	TC-15	AVC Filter
12	.02	200		424-.02	DT2S2	ST-4-02	TC-12	Screen Decoupling
13	.1	200		424-.1	DT2P1	ST-4-2	TC-2	Fil. Bypass
14	100	500		1468-.0001	5W5T1	M0.5-31	1FM-31	Diode Filter
15	100	300		1468-.0001	5W5T1	M0.5-31	1FM-31	AF Plate Bypass
16	47	300		1468-.00005	5W5Q5	M0.5-45	1FM-45	Osc. Grid Cap.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	DEWALD PART No.	IRC PART No.	CLAROSTAT PART No.	
17A	1 Meg.	½	3012	D13-137	AM-63-2	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 17A per instructions
C	Switch		" "	42	SW-A2	" " " " "

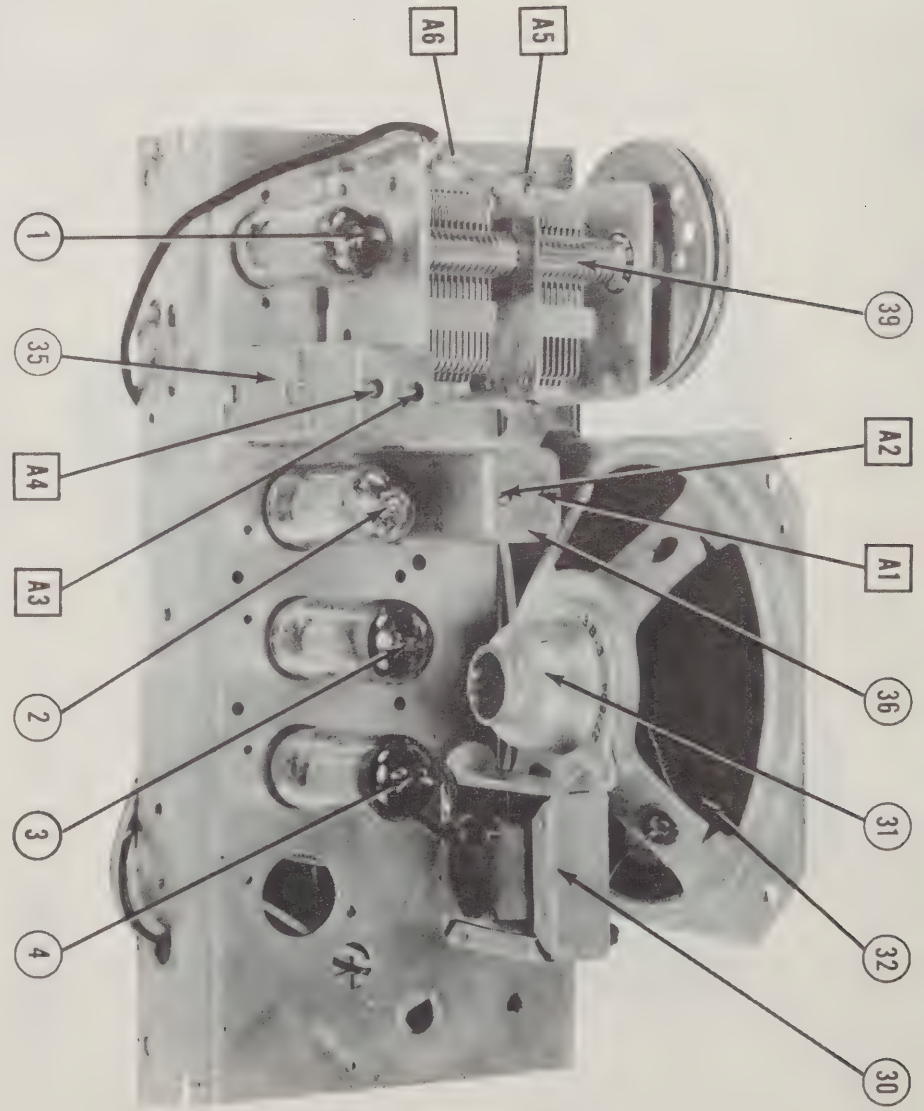
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	DEWALD PART No.	IRC PART No.	
18	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Osc. Grid
19	4700Ω	½		BTS-4700	Yl.-Vi.-Red Screen Decoup.
20	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
21	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
22	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
23	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
24	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen
25	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Output Grid
26	390Ω	½		BW-½-390	Or.-White-Br. Bias
27	27Ω	½		BW-½-27	Filament String
28	510Ω	½		BTS-470	Grn.-Br.-Br. " "
29	1000Ω	½		BTS-1000	Br.-Blk.-Red " "

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		DEWALD PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
30	8500Ω	3.5Ω	650Ω	.5Ω	Part of 7003B3	A-3848#	T22S47#	A-2900#	#Bend mounting tabs down, file out slots and mount on original brackets.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: DEWALD PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
31	FIELD PM	VC IMP. 3.5Ω	7003B3	ST-113 Mod. P4-X	4A07	
32	CONE DIA. 4"	VC DIA. 9/16"				

R F COILS

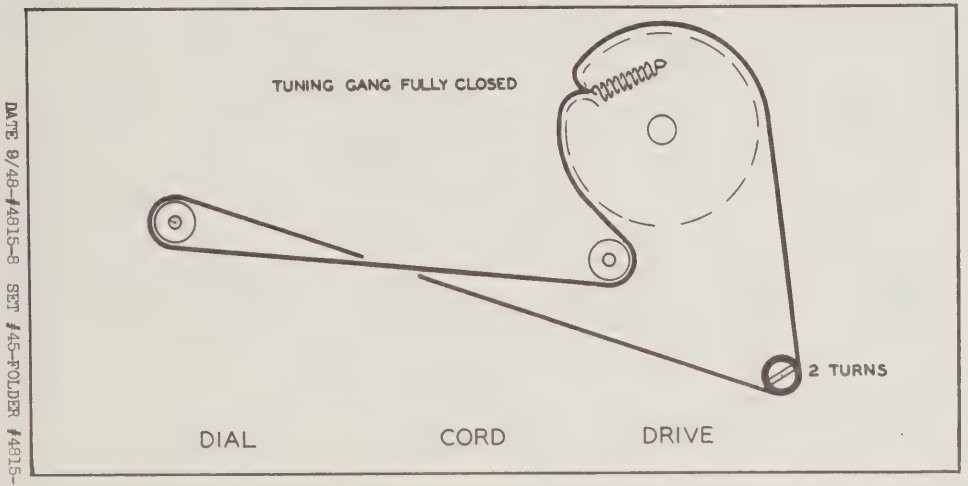
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: DEWALD PART No.	MEISSNER PART No.	
33	Loop Ant.		3.2Ω	1037		
34	Osc. Coil	1.3Ω	6.2Ω	1034	14-1060	
35	Input IF	24.2Ω	24.2Ω	1027C-4	16-6668	
36	Output IF	26Ω	26.2Ω	1027C-2	16-6669	

BATTERIES

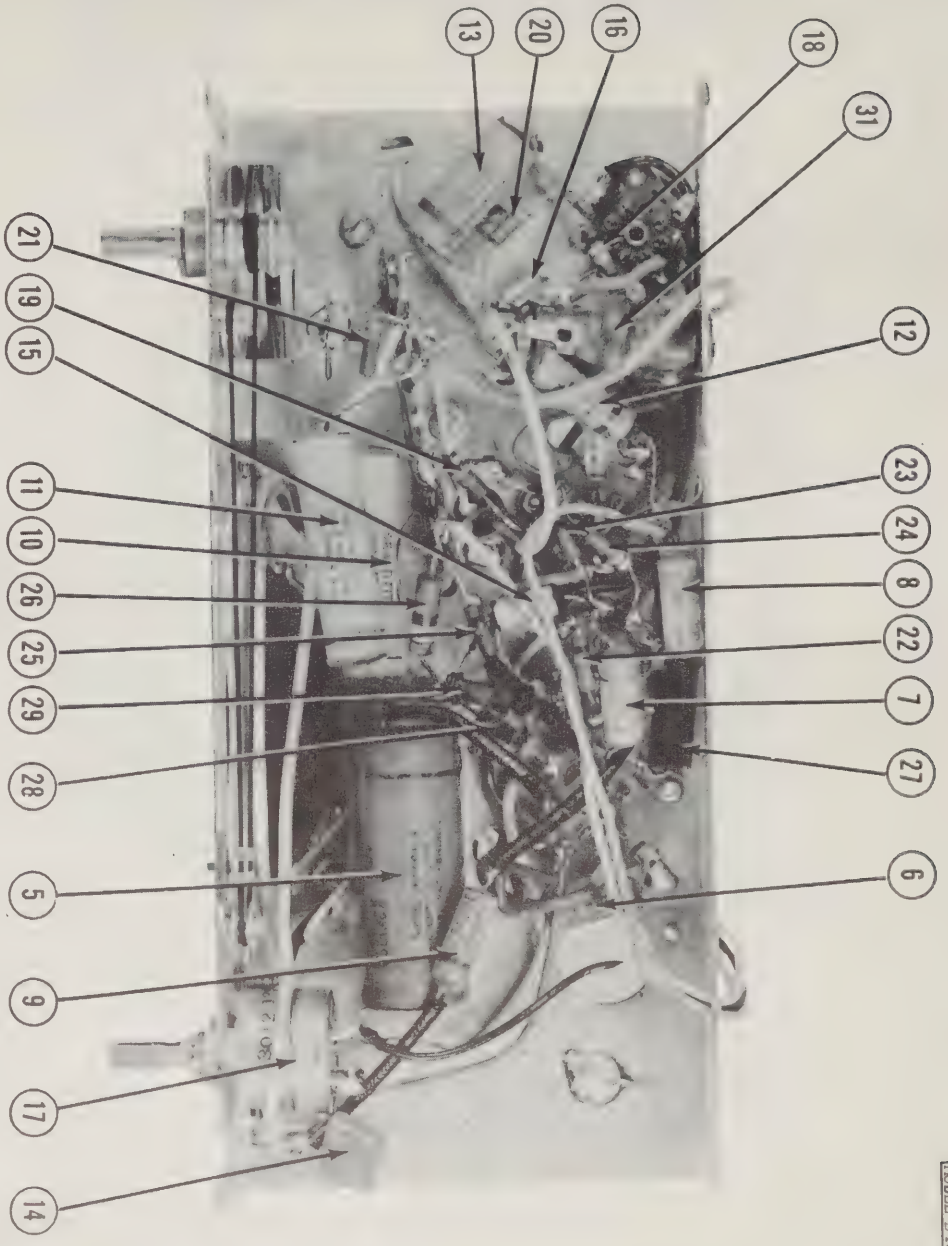
ITEM No.	VOLTAGE	DEWALD PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
37	4.5V "A"		746			G3			
38	67.5V "B"			467			XX45		

MISCELLANEOUS

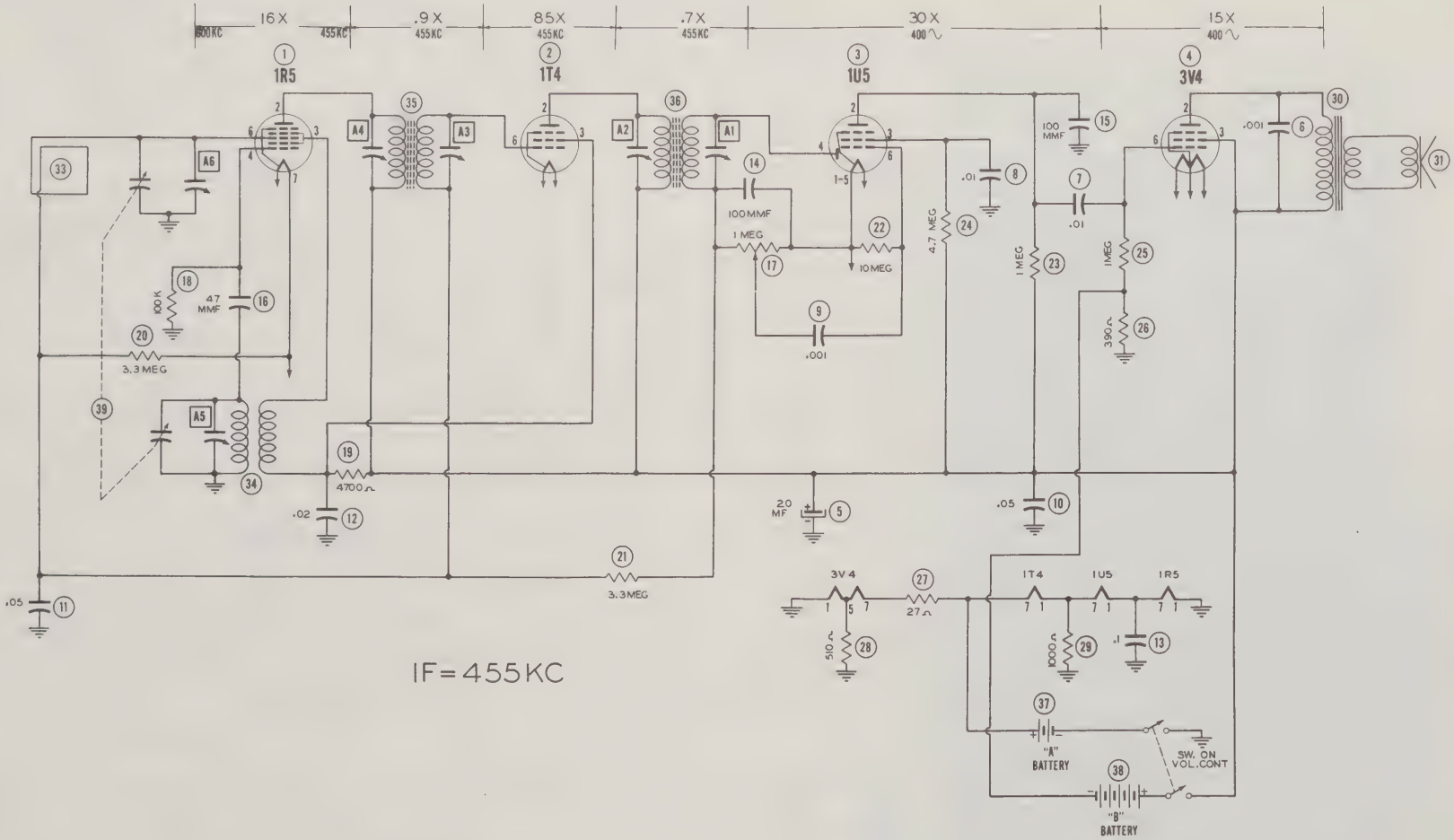
ITEM No.	PART NAME	DEWALD PART No.	NOTES
39	2 Gang Var. Cap.	2017-B	(25-465MMF, 25-193MMF)
	Cabinet	4064	
	Knobs	4055A	



CHASSIS—BOTTOM VIEW



DEWALD MODEL B402



IF=455KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	62VDC	50VDC	-5.2VDC§	0V.	0V.	1.2VDC
2	1T4	2.5VDC	62VDC	50VDC	62VDC	2.5VDC	0V.	3.8VDC
3	1U5	1.2VDC	25VDC	25VDC	.2VDC	0V.	0V.	2.5VDC
4	3V4	0V.	30VDC	62VDC	62VDC	1.2VDC	-3VDC	2.5VDC

§TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	1 Meg.	1 Meg.	100KΩ	0Ω	2 Meg.	*
2	1T4	*	1 Meg.	1 Meg.	1 Meg.	*	2 Meg.	*
3	1U5	*	2 Meg.	5.7 Meg.	1 Meg.	0Ω	10 Meg.	*
4	3V4	0Ω	1 Meg.	1 Meg.	1 Meg.	*	1 Meg.	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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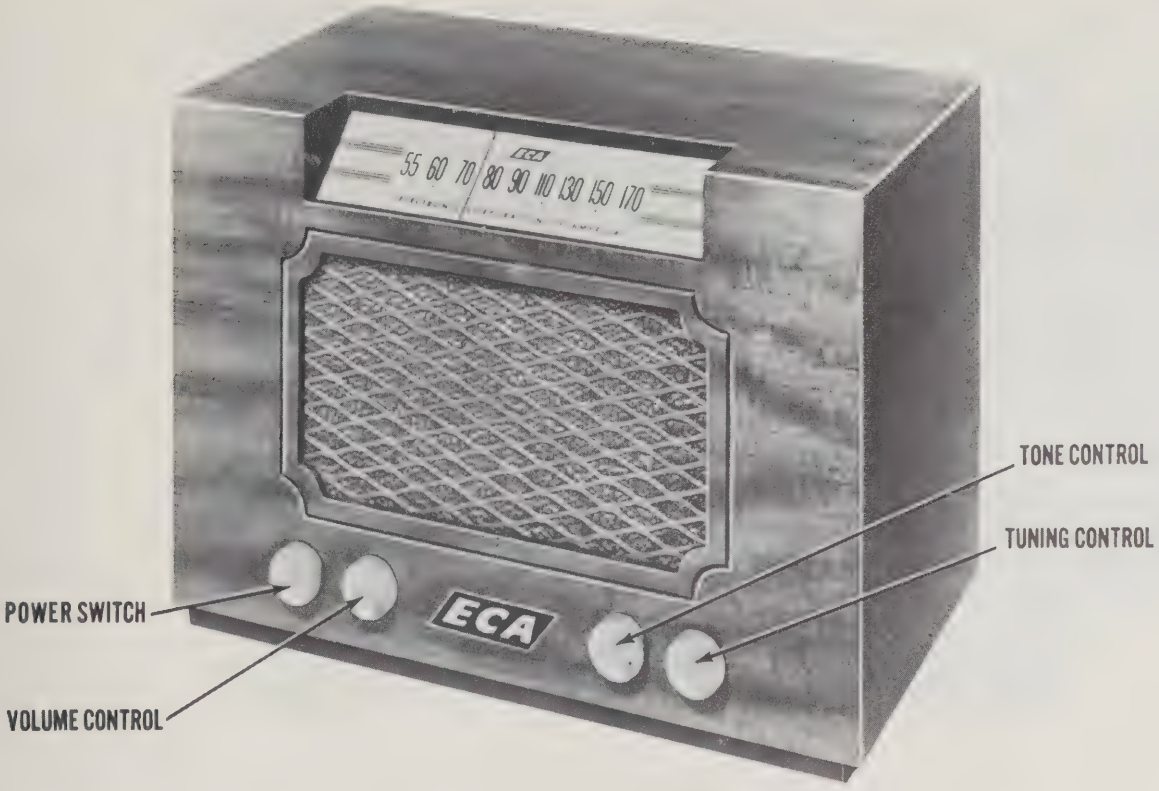
4815-8

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting across volume control.



ECA MODEL
132

ECA MODEL
132

ECA MODEL 132

TRADE NAME	ECA, Model 132
MANUFACTURER	Electronic Corp. of America, 170 53rd St., Brooklyn, N.Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types, 6SA7 Converter, 6SF7 IF-Det.-AVC, 6SL7GT AF-Inverter, (2) 25L6GT Power Output, (2) 25Z6GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	530-1670KC RATING .46 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 6SA7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	200MMFD.	High side to ext. ant. lead. Low side to B-.	1670KC	"	"	A5	Adjust for maximum output.
3	200MMFD.	"	1500KC	Tune for maximum output.	"	A6	" " " "

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DATE 9/48-#4815-9 SET #45-FOLDER #9

PARTS LIST AND DESCRIPTIONS

ECA MODEL 132

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ECA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	6SA7	6SA7	8R	
2	IF-Det.-AVC	6SF7	6SF7	7AZ	
3	AF-Inverter	6SL7GT	6SL7GT	8BD	
4	Power Output	25L6GT	25L6GT	7AC	
5	" "	25L6GT	25L6GT	7AC	
6	Rectifier	25Z6GT	25Z6GT	7Q	
7	"	25Z6GT	25Z6GT	7Q	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ECA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	40	150		PRSA150/40-40	EDL4415	DSB-2x40-150	TA-440	Filter-Blue
B	40	150		PRSA150/40-20	EDL4215	DSB-3x20-150*	TA-240	" -Red
C	40	150						" -Yellow
D	10	150						" -Green
9	.05	400		484-.05	DT4S5	MPH-4-05	TC-15	Line Filter
10	.2	200		484-.2	DT4P2	ST-4-2	72P3	Line Isolation
11	.005	600		684-.005	DT6D5	ST-6-005	TC-25	Ext. Ant. Isolation
12	.02	400		484-.02	DT4S2	ST-4-02	TC-12	Audio Coupling
13	.02	400		484-.02	DT4S2	ST-4-02	TC-12	" "
14	.02	400		484-.02	DT4S2	ST-4-02	TC-12	" "
15	.002	600		684-.002	DT6D2	ST-6-002	TC-22	Tone Comp.
16	.2	200		484-.2	DT4P2	ST-4-2	TC-2	Conv. Screen Bypass
17	.05	200		484-.05	DT2S5	ST-4-05	TC-15	AVC Filter
18	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
19	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	" " "
20	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
21	250	500		1468-.00025	5W5T25	MO.5-325	1FM-325	Tone Comp.

*Parallel sections to obtain desired capacity.

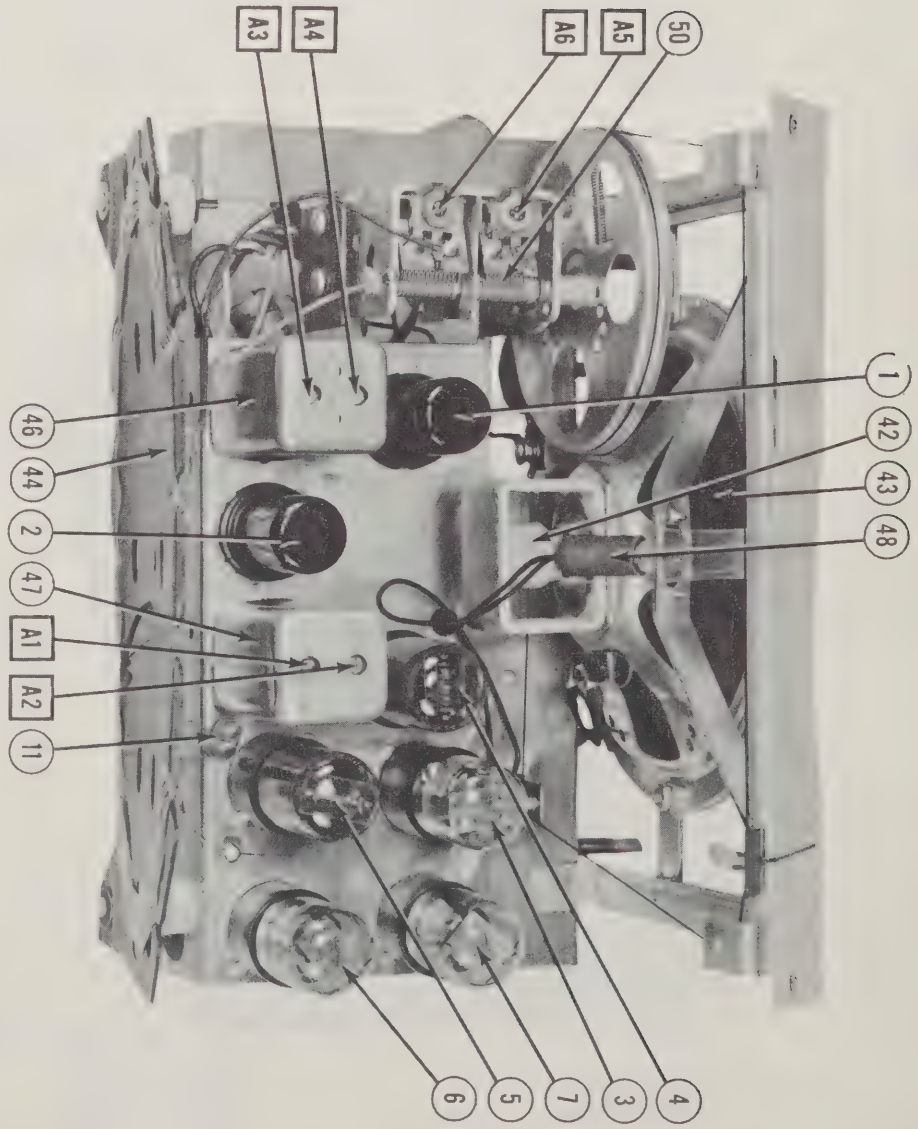
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ECA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
22A	1 Meg.	½	S-1017	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 22A per instructions
23A	1 Meg.	½	S-1017	D13-137	M-63-Z	Tone Control
B	Shaft		Not Req.	A	Not Req.	Attach to 23A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ECA PART No.	IRC PART No.	IDENTIFICATION CODES
24	22KΩ	½		BTS-22KΩ	Red-Red-Or. Osc. Grid
25	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
26	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode Filter
27	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Grid
28	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AF Plate Load
29	2200Ω	½		BTS-2200	Red-Red-Red AF Cathode
30	18KΩ	½		BTS-18K	Br.-Gray-Or. Phase Inv. Grid
31	100KΩ	½*		BTS-100K	Br.-Blk.-Yl. Phase Inv. Plate Load
32	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
33	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. " "
34	82Ω	1		BW-1-82	Gray-Red-Blk. Output Cathode
35	100Ω	½		BW-½-100	Br.-Blk.-Br. Feedback
36	33Ω	1		BW-1-33	Or.-Or.-Blk. "
37	1500Ω	1		BTA-1500	Br.-Grn.-Red Filter
38	1500Ω	2		BT-2-1500	Br.-Grn.-Red "
39	12Ω	2		BW-2-12	Br.-Red-Blk. Dial Light Shunt
40	220KΩ	½		BTS-220K	Red-Red-Yl. Line Isolation

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ECA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
41	2900Ω CT	3.25	260Ω	.3Ω	STA116	A-3856	T22887	A-2901	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			ECA PART No.	JENSEN PART No.	QUAM PART No.	
42	FIELD PM	VC IMP. 3.25Ω	SQL-105	ST-110 Mod. P6-V	6A21	
43	CONE DIA. 6"	VC DIA. 9/16"				

R F COILS

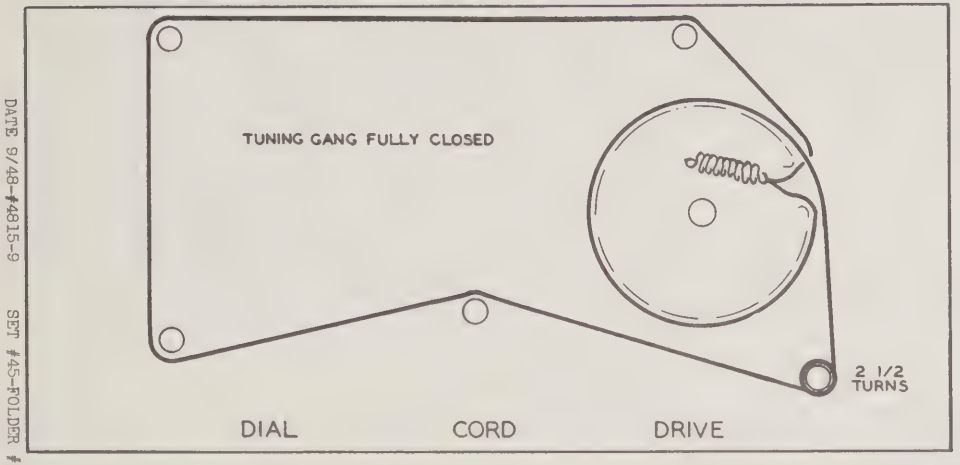
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	ECA PART No.	MEISSNER PART No.	
44	Loop Ant.	0Ω	1.3Ω			
45	Osc. Coil		6.3Ω		14-1060	
46	Input IF	15Ω	15.8Ω		16-5712	
47	Output IF	10Ω	10Ω		16-5714	

DIAL LIGHT

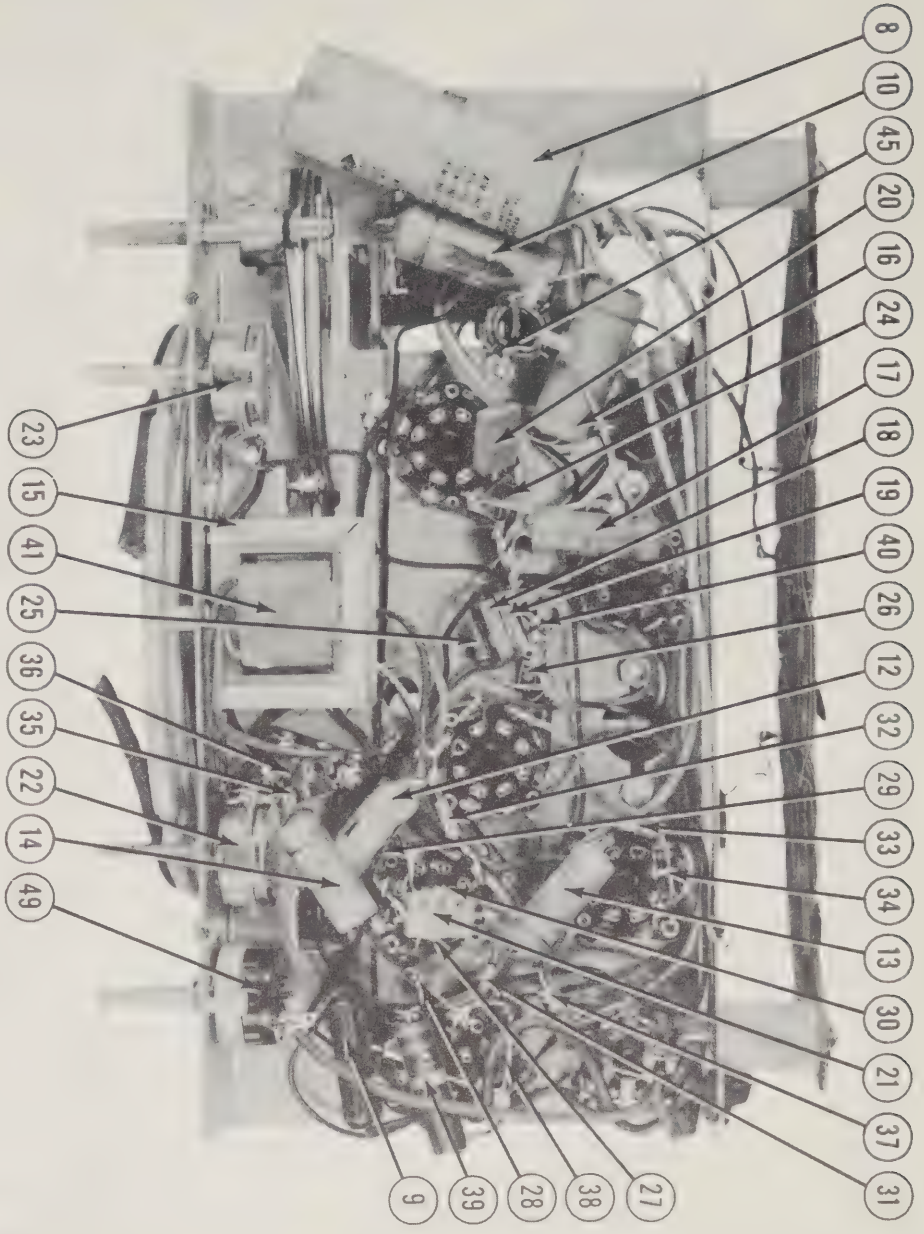
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					ECA PART No.		
48	Bayonet	6-8	0.25A	Blue			Type 44

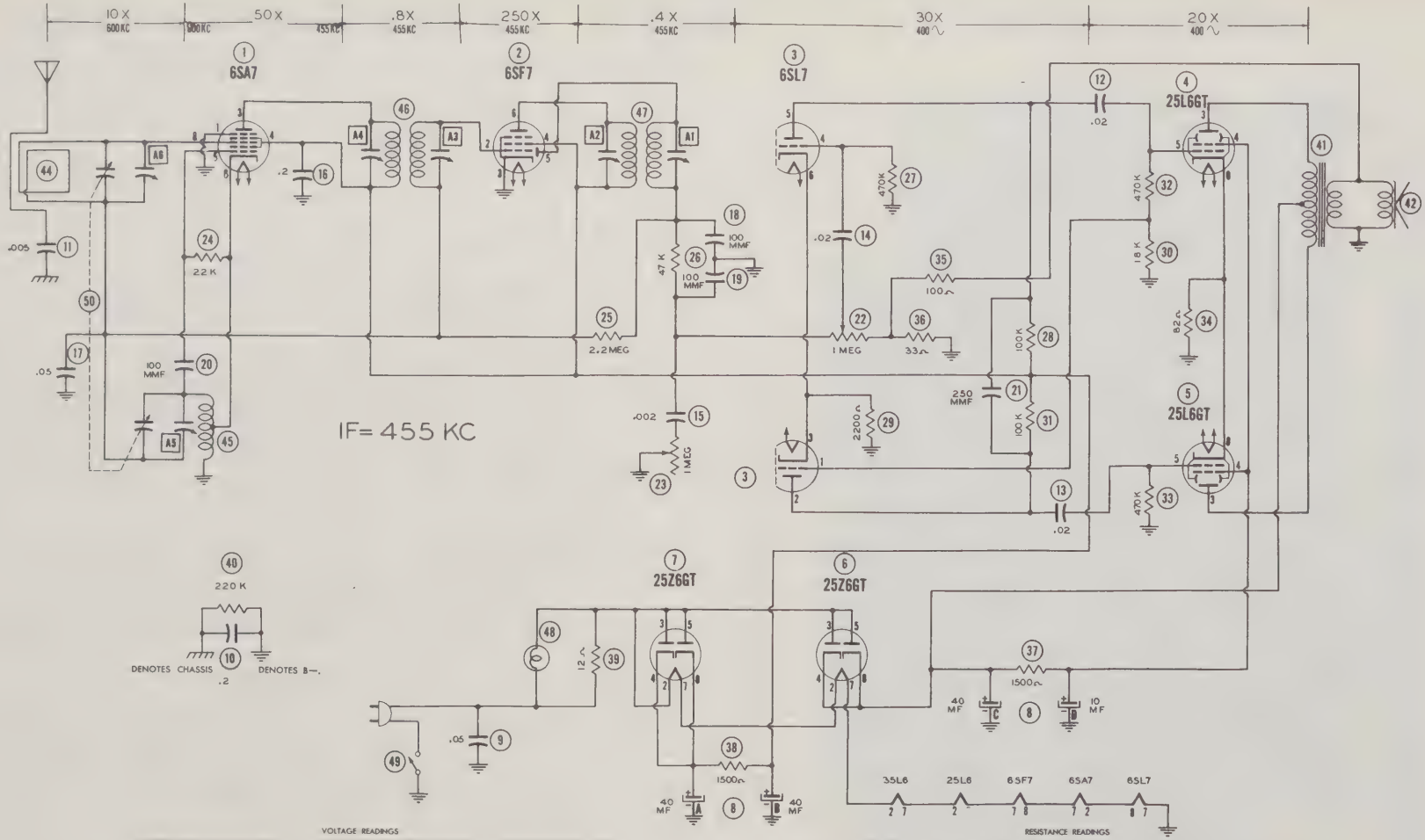
MISCELLANEOUS

ITEM No.	PART NAME	ECA PART No.	NOTES
49	Switch		Power
50	2 Gang Var. Cap.		(20-465MMF, 25-195MMF)



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	0V.	[illegible]	[illegible]	[illegible]	[illegible]	0V.	13VAC	[illegible]
2	6SF7	0V.	[illegible]	0V.	[illegible]	[illegible]	90VDC	13VAC	13VAC
3	6SL7GT	0V.	75VDC	1VDC	0V.	75VDC	1VDC	0V.	6.4VAC
4	25L6GT	0V.	43VAC	115VDC	110VDC	0V.	0V.	15VAC	7.4VDC
5	25L6GT	0V.	65VAC	115VDC	110VDC	0V.	0V.	43VAC	7.4VDC
6	25Z6GT	0V.	[illegible]	115VAC	120VDC	115VAC	0V.	65VAC	120VDC
7	25Z6GT	117VAC	117VAC	115VAC	120VDC	115VAC	90VDC	90VAC	120VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	220KΩ	3Ω	40KΩ	40KΩ	22KΩ	0Ω	8Ω	3.3 Meg
2	6SF7	220KΩ	3.3 Meg.	0Ω	40KΩ	1 Meg.	40KΩ	13Ω	8Ω
3	6SL7GT	18KΩ	140KΩ	2.2KΩ	470KΩ	140KΩ	2.2KΩ	0Ω	3Ω
4	25L6GT	INF.	2Ω	40KΩ	40KΩ	490KΩ	INF.	13Ω	82Ω
5	25L6GT	INF.	4Ω	40KΩ	40KΩ	470KΩ	0Ω	29Ω	82Ω
6	25Z6GT	INF.	6Ω	80Ω	40KΩ	80Ω	INF.	4Ω	40KΩ
7	25Z6GT	8Ω	80Ω	80Ω	40KΩ	80Ω	40KΩ	6Ω	40KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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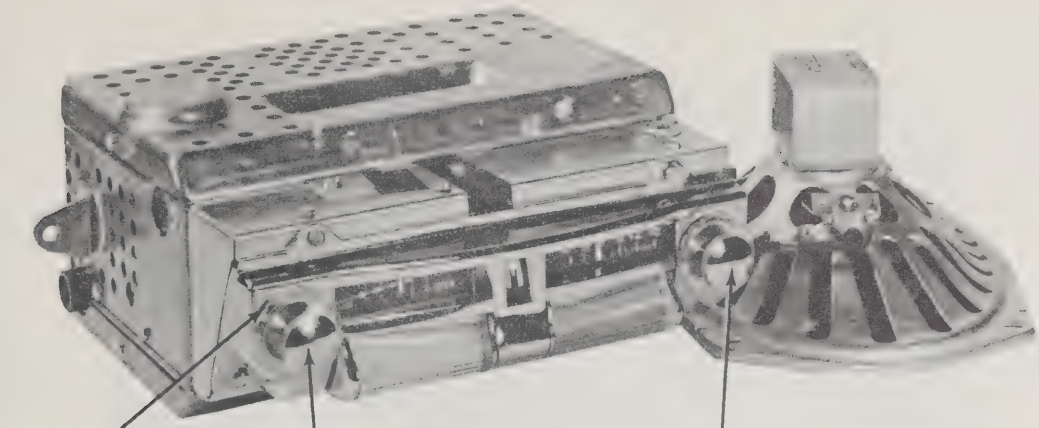
4815-9

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



FORD MODEL 7070

TRADE NAME	Ford, Model 7070 (51A-18805-B2)
SUPPLIER	Ford Motor Car Co., Detroit, Mich.
TYPE SET	Battery Operated Custom Built 1947 Ford Automotive Superheterodyne Receiver
TUBES (SIX)	Types, 7A7 RF Amp., 7B8 Converter, 7A7 IF Amp., 7B6 Det.-AVC-AF, 7C5 Power Output, 7Y4 Rectifier.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	535-1605KC RATING 5.4 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 6 (grid) of 7B8 Tube. Low side to chassis.	265KC	Tuning cores fully out.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	60 MMFD.	High side to ant. socket. Low side to chassis.	1605KC	"	"	A5	" " " "
3	60 MMFD.	"	1200KC	Tune for maximum output.	"	A6	Adjust for maximum output. If calibration is off loosen screws holding dial and reposition dial for correct calibration.
	The following Steps 4 through 7 are to be used only after a core or coil has been replaced.						
4	60 MMFD	High side to ant. socket. Low side to chassis.	1700KC	Tuning core fully out.	Across voice coil	A5,A6, A7	Screw ant., RF and osc. cores (A8, A9 & A10) completely out of coil forms. Adjust A5, A6 and A7 for maximum output. Readjust ant., RF & osc. cores to their approximate original positions.
5	60 MMFD	"	1200KC	1200KC	"	A8	Adjust for maximum output.
6	60 MMFD	"	"	Tune for maximum output.	"	A9,A10	" " " "
7	60 MMFD.	"	600KC	600KC	"	All	Rock tuning control and adjust for maximum output. Repeat Steps 5, 6 and 7 until no further improvement can be made. Seal all core adjustments with cement to prevent slippage. Check high freq. limit. If range is higher or lower than 1605 bend mechanical stop for tuner cross arm for high frequency limit of 1605KC.

After reinstalling receiver in car, allow it to warm up for approximately 15 minutes, tune in a weak station at approximately 1200KC and adjust A7 for maximum volume with antenna fully extended.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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DATE 9/48-#4815-10 SET #45-FOLDER #10

FORD MODEL 7070
(51A-18805-B2)

FORD MODEL 7070
(51A-18805-B2)

PARTS LIST AND DESCRIPTIONS

FORD MODEL 7070

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	7A7	7A7	8V	
2	Converter	7B8	7B8	8X	
3	IF Amp.	7A7	7A7	8V	
4	Det.-AVC-AF	7B6	7B6	8W	
5	Power Output	7C5	7C5	5AA	
6	Rectifier	7Y4	7Y4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DETROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	20	350	DA-70243	AF32K4A	UP15D35	DY-2x15-350	EL-254	■ Filter
B	10	300						▲ "
8	.008	1000		1689-008	MD16D8	STM-16-008	TR-28	Buffer
9	.5	120	DA-55491		DT2P25	SHH-1		Hash Filter
10	.5	120	DA-55491		DT2P25	SHH-1		" "
11	.005	600	DBD630502	684-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
12	.003	600	DBDD30302	684-003	DT6D3	ST-6-003	TC-23	Tone Comp.
13	.01	600	DBD630103	684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
14	.02	200	DBD230203	484-02	DT2S2	ST-4-02	TC-12	Delay Muting Cap.
15	.005	600	DBD630502	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
16	.02	200	DBD230203	484-02	DT2S2	ST-4-02	TC-12	Tone Compensation
17	.05	200	DBD230503	484-05	DT2S5	ST-4-05	TC-15	IF Cathode Bypass
18	.1	400	DBD230104	484-.1	DT4P1	ST-4-1	TC-1	Screen Bypass
19	.05	200	DBD230503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
20	.1	200	DBD230104	484-.1	DT2P1	ST-2-1	TC-1	Cathode Bypass
21	.01	600	DBD630103	684-01	DT6S1	ST-6-01	TC-11	Ant. Coupling
22	220	500	DBM74A221	1468-0002	5W5T2	MO.5-32	1FM-32	AF Plate Bypass
23	100	500						Osc. Coupling-See Note
24	100	500	DBM74A101	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
25	350	300	DA-7030	1469-00035				Fixed Trimmer-Cer.
26	250	500	DA-70384	1469-00025	5R5T25	MOS.5-325		" "
27	100	500	DBM74A101	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling
28	100	500	DBM64A101	1469-0001	5R5T1	MOS.5-31	MS-31	Fixed Trimmer

Note-Part of Item #58.

CONTROLS

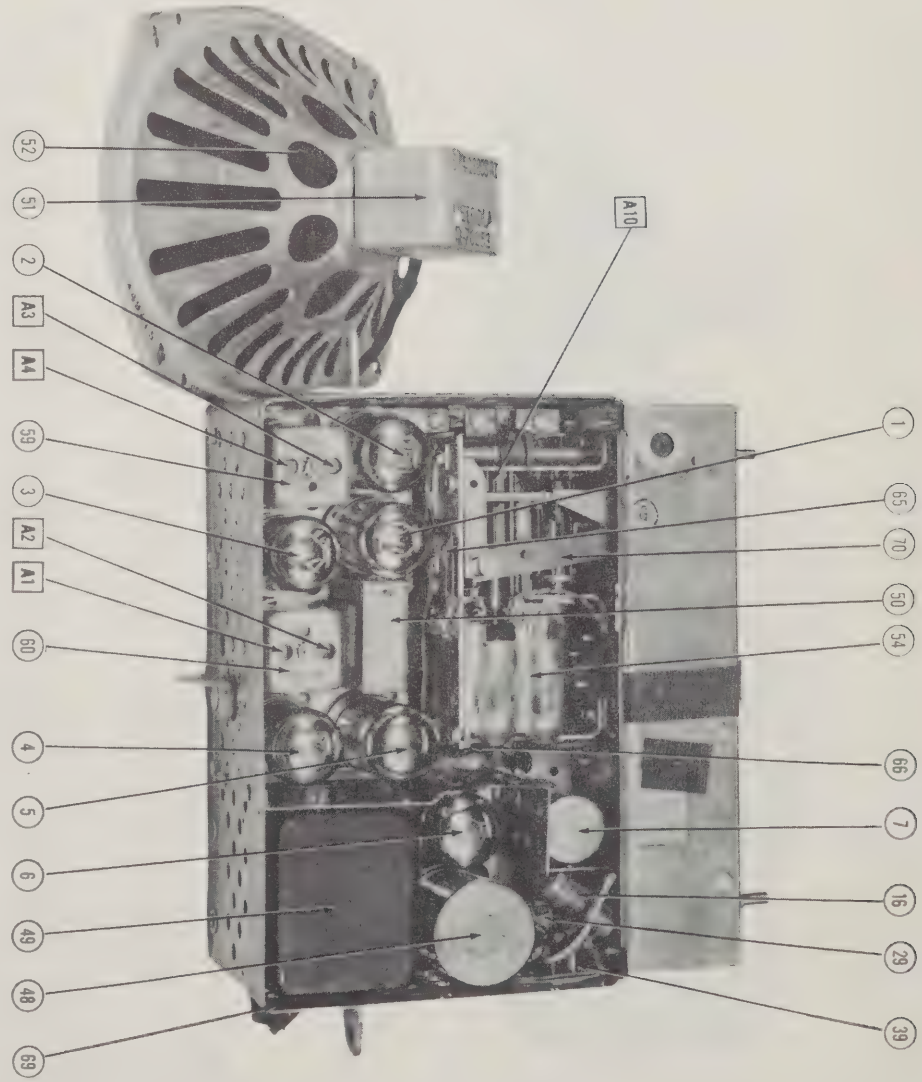
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DETROLA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
29	250KΩ - 1.5 Meg.	½	DB-70260			Volume Control & Sw. Tone Control See Note
30	800Ω	1	DA-70091			Sensitivity Control

Note-Dual control operated by concentric shaft.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DETROLA PART No.	IRC PART No.	IDENTIFICATION CODES
31	330KΩ	½	DBR17B334	BTS-330K	Or.-Or.-Yl. RF Grid
32	18KΩ	½	DBR16C183	BTS-18K	Br.-Gray-Or. RF Plate
33	330KΩ	½	DBR17B334	BTS-330K	Or.-Or.-Yl. Conv. Grid
34	56KΩ	½	DBR16B563	BTS-56K	Grn.-Blue-Or. Osc. Grid
35	15KΩ	½	DBR17C153	BTS-15K	Br.-Grn.-Or. Conv. Anode Load
36	1 Meg.	½	DBR17B105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
37	220Ω	½	DBR17B221	BTS-220	Red-Red-Br. IF Cathode
38	33KΩ	1	DBR16E333	BTA-33K	Or.-Or.-Or. Screen Dropping
39	22KΩ	½	DBR16B223	BTS-22K	Red-Red-Or. Tone Comp.
40	15 Meg.	½	DBR17B156	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
41	1 Meg.	½	DBR17B105	BTS-1 Meg.	Br.-Blk.-Grn. Muting Network
42	330KΩ	½	DBR17B334	BTS-330K	Or.-Or.-Yl. AF Plate
43	330KΩ	½	DBR17B334	BTS-330K	Or.-Or.-Yl. Output Grid
44	270Ω	2	DBR26E271	BW-½-270	Red-Vi.-Br. Output Cathode
45	1800Ω	1	DBR56G182	BTA-1800	Br.-Gray-Red Filter
46	82Ω	½	DBR16C820	BW-½-82	Gray-Red-Blk. Hash Supp.
47	82Ω	½	DBR16C820	BW-½-82	Gray-Red-Blk. " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: RADIART PART No.	INSTALLATION NOTES
48	Interrupter	6.3 V DC	115 ∿	DB-70347	5301	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
49	6.3V DC @ 3.0A	465V CT @.05A DC			DC-70267-C			

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
50	6000Ω	3.5Ω	500Ω	.5Ω	DC-70264-C	A-3856*	T22846*	A-2930*	*Bend mounting tabs down.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.				
51	PM	3.5Ω	DD-70253		69A3	
	CONE DIA.	VC DIA.				
52	6"x9"	3/4"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: MEISSNER PART No.	
53	Ant. Loading Coil		1Ω	DB-70200		
54	Ant. Coil		11.8Ω	DA-70052		Items 54 and 55 replaced as a unit.
55	RF Coil		12Ω			
56	Osc. Coil		5.7Ω	DA-70051		
57	Osc. Trimmer Coil		1Ω	DB-70204		
58	Osc. Shunt Coil		2.2Ω	DB-70225		
59	Input IF	60Ω	63Ω	DB-70265		
60	Output IF	63Ω		DB-70266		
61	Hash Choke		0Ω	DA-70205		
62	Vibrator Choke		.4Ω	DA-70242		

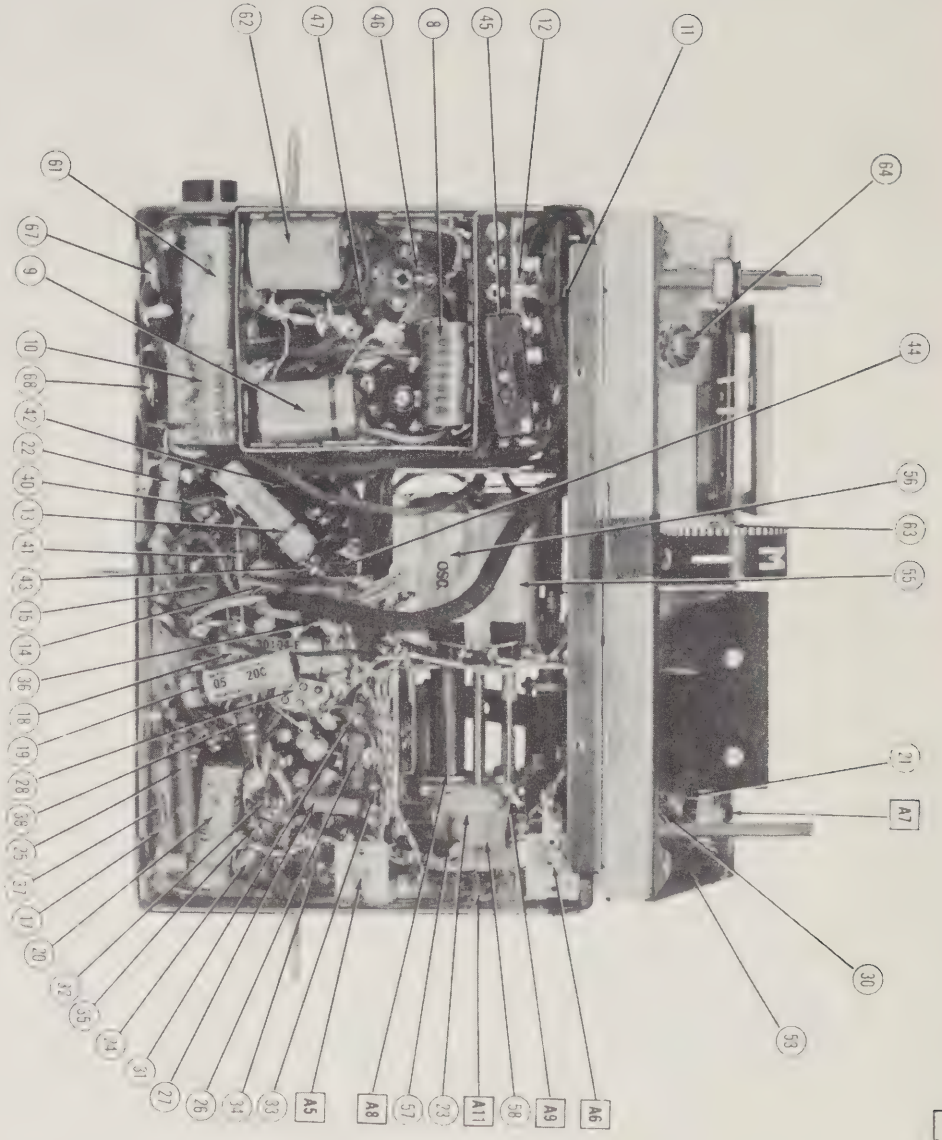
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
63	Bayonet	6-8	0.25	Blue			Type 44

MISCELLANEOUS

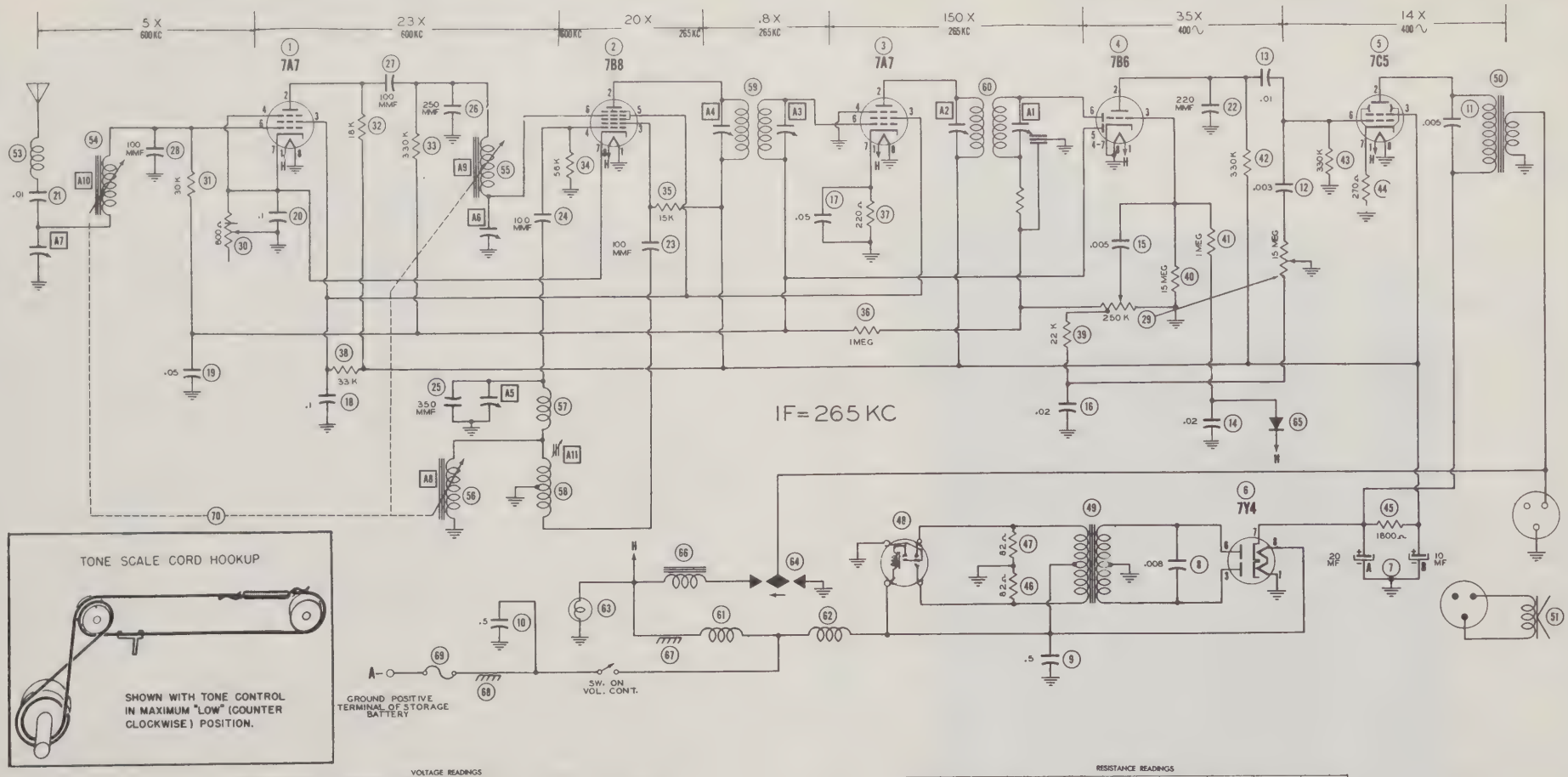
ITEM No.	PART NAME	DETROLA PART No.	NOTES
64	Switch	DB-70210	Station Change & Muting
65	"		Delayed Muting
66	Solenoid		
67	Spark Plate		
68	" "		
69	Fuse	DA-55540-1	20 Amp.
70	Tuning Assembly	DE-70003	(Includes Items 54, 55 & 56)
A5	Trimmer	DA-70293	Osc. Adj.
A6	"	DA-70349	RF Adj.
A7	"	DA-70295	Ant. Adj.
	Dial Scale	DA-70296	
	Dial Pointer	DA-70005-A	

CHASSIS—BOTTOM VIEW



DATE 5/48-#4815-10 SET #45-FOLDER #10

FORD MODEL 7070



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	6.3VDC	140VDC	120VDC	6.1VDC	0V.	-.2VDC	6.1VDC	0V.
2	7B8	0V.	195VDC	145VDC	-17VDC§	70VDC	-.2VDC	6.1VDC	6.3VDC
3	7A7	6.3VDC	195VDC	70VDC	0V.	0V.	-.4VDC	1.6VDC	0V.
4	7B6	6.3VDC	100VDC	-.4VDC	0V.	-.4VDC	-.4VDC	0V.	0V.
5	7C5	6.3VDC	210VDC	195VDC	0V.	0V.	0V.	8.6VDC	0V.
6	7Y4	0V.	0V.	230VAC	0V.	0V.	230VAC	220VDC	6.3VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	.1Ω	270KΩ	280KΩ	700Ω	0Ω	1.5 Meg.	700Ω	0Ω
2	7B8	0Ω	250KΩ	270KΩ	56KΩ	280KΩ	1.5 Meg.	700Ω	.1Ω
3	7A7	.1Ω	250KΩ	280KΩ	0Ω	0Ω	1.2 Meg.	220Ω	0Ω
4	7B6	.1Ω	580KΩ	15 Meg.	INF.	1.2 Meg.	300KΩ	0Ω	0Ω
5	7C5	.1Ω	250KΩ	250KΩ	INF.	INF.	330KΩ	270Ω	0Ω
6	7Y4	0Ω	INF.	350Ω	INF.	INF.	375Ω	250KΩ	.1Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4815-10

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

GENERAL ELECTRIC MODEL 376

TRADE NAME	General Electric, Models 376, 377, 378
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	AC Operated Combination Phono-Radio, AM-FM Superheterodyne Receiver
TUBES (NINE)	Types, 6AG5 RF Amp., 6BE6 Converter, 6BA6 1st IF Amp., 6AU6 2nd IF Amp., 6AU6 Limiter, 6S8GT AM-FM Det.-AF Amp., 6SC7 Phono Pre-Amp., 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC — RATING .65 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC — FREQ. MOD. 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning cap. fully closed and set pointer 2-1/8" from top left edge of dial backplate. This is the calibration mark referred to in steps below.

When connecting sig. gen. to converter grid, a shielded lead must used with not more than 1/16" of bare lead exposed. Ground connection should be as close to high side as possible. Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Use insulated alignment screwdriver for all adjustments.

ALIGNMENT USING AM SIGNAL GENERATOR, VTVM & OUTPUT METER

If VTVM is not available, a 20,000Ω per volt DC voltmeter may be used.

The 200KΩ resistor in series with the VTVM should be connected (Preferably soldered) directly at the test point to reduce capacity loading and to isolate the VTVM from the IF signal. The lead from sig. gen. must be dressed away from all previously aligned stages to prevent regeneration and consequent misalignment.

In Steps 4 thru 9 attenuate sig. gen. output to maintain meter reading of not more than 1 volt.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	455KC	BC (fully clockwise)	Tuning cap. fully open.	Across voice coil	A1, A2, A3, A4, A5	Adjust for maximum output

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
2	.01 MFD	High side to Pin 1 (grid) of 6AU6 Limiter Tube (5). Low side to chassis.	10.7MC (Unmodulated)	FM (fully counter-clockwise)	Tuning vanes fully in.	DC probe to Point (A). Common to chassis	A6	Adjust for zero deflection.
3	.01 MFD	"	Tune sig. gen. to Point of maximum deflection	"	"	"	A7	Tune sig. gen. for maximum deflection and adjust A7 for maximum deflection.
4	.01 MFD	High side to Pin 1 (grid) of 6AU6 2nd IF Tube (4). Low side to chassis.	10.7MC (Unmodulated)	"	"	DC probe in series with 200K ohm to Point (A). Common to ground. (See pre-alignment instructions.	A8, A9	Adjust for maximum deflection.
5	.01 MFD	High side to Pin 1 (grid) of 6AU6 1st IF Tube (3). Low side to chassis.	"	"	"	"	A10, A11	Adjust for maximum deflection.
6	.01 MFD	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	"	"	"	"	A12, A13	"
7	300Ω carbon res.	High side to ungrounded FM ant. terminal. Low side to chassis. (Line ant. disconnected).	98MC (Unmodulated)	"	3-1/16" from calibration mark.	"	A14	Loosen A14 completely and adjust for first peak. Adjust for maximum deflection.
8	"	"	"	"	Tune for maximum deflection.	"	A15	Adjust for maximum deflection. Repeat Steps 7 & 8 until no further improvement can be made.
	"	"	"	"	"	"	A16	Adjust for maximum deflection. Repeat 7, 8 & 9 until no further improvement.

GENERAL ELECTRIC MODELS
376, 377, 378

GENERAL ELECTRIC MODELS
376, 377, 378

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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DATE 9/48-#4815-11 SET #45-FOLDER #11

ALIGNMENT INSTRUCTIONS (CONTINUED)

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
10		Loop	1500KC	BC	5-1/16" from calibration mark.	Across voice coil.	A17	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Position of radiation loop must not be changed during this or following step.
11		"	"		Tune for maximum output.	"	A18, A19	Adjust for maximum output. Repeat Steps 10 & 11 until no further improvement can be made.

ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation. Connect the synchronized sweep voltage from the sig. gen. to the horizontal input of the scope. The hor. sweep voltage may be taken from the power line if sig. gen. does not have a sync. voltage output. There may be some phase shift encountered between sig. gen. and scope horizontal sweep resulting in a double trace pattern. If provision is made for this in the scope or sig. genl rotate phase control until the two curves coincide. If no provision is made for this, or synchronizing voltage is taken from power line, the same thing may be accomplished by inserting a cap. of suitable value (.01 to .1 MFD) in series with the hor. sync. input.

Leads from sig. gen. must be dressed away from all stages under alignment to prevent regeneration and consequent misalignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1	.01 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	455KC (60 ∿ modulation 40KC sweep)	BC (fully clockwise)	Tuning cap. fully open.	Vertical input in series with 200KΩ resistor to Point (C). Ground to chassis.	A1,A2, A3,A4, A5.	Adjust for maximum amplitude and symmetry of pattern per Fig. 1.
2	.01 MFD.	"	10.7MC (60 ∿ modulation and 600KC sweep)	FM (fully counter-clockwise)	"	Vertical input in series with 200KΩ resistor to Point (B). Ground to chassis.	A8,A9, A10,A11 A12,A13	Adjust for maximum amplitude and symmetry of pattern per Fig. 2.
3	.01 MFD.	"	"	"	"	Vertical input in series with 200KΩ resistor to Point (A). Ground to chassis.	A7,A6	Alternately adjust A7 for maximum amplitude and straightness of diadiagonal line and A6 for centering of pattern per Fig. 3 on horizontal scope sweep line.
4	300Ω carbon res.	High side to ungrounded FM ant. terminal. Low side to chassis. (Line ant. disconnected)	98MC (600KC sweep & 60 ∿ modulation)	"	3-1/16" from calibration mark.	Vertical input in series with 200KΩ resistor to Point (B). Ground to chassis.	A14	Loosen A14 to minimum capacity. Adjust to first pattern of Fig. 2 and then adjust to center pattern on horizontal scope line.
5	"	"	"	"	Tune to center curve on scope screen.	"	A15,A16	Adjust A15 & A16 for maximum amplitude of pattern of Fig. 2. If these adjustments cause the pattern to shift off center readjust A14 to center pattern on horizontal scope line and repeat A15 & A16 adjustments for maximum amplitude.
6	200MMFD	High side to ext. ant. terminal. Low side to chassis.	1500KC (Freq. modulated 60 ∿ modulation with 40KC sweep)	BC	5-1/16" from calibration mark.	Vertical input in series with 200KΩ resistor to Point (C). Ground to chassis.	A17	Adjust to center pattern of Fig. 1 on scope screen.
7	200MMFD	"	"	"	Tune to center curve on scope screen	"	A18,A19	Adjust for maximum amplitude of pattern per Fig. 1. If adjustment of A18 & A19 causes pattern to shift off center readjust A17 to center pattern on horizontal scope line and repeat adjustments of A18 & A19.

FIG. 1

FIG. 2

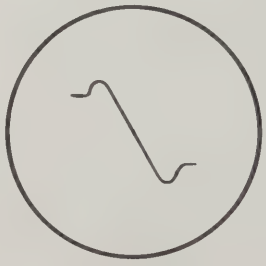


FIG. 3

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove phono-pickup plug from phono pre-amp. chassis.
3. Remove phono pre-amp. audio plug from tuning chassis.
4. Remove pilot light from bracket at lower front of cabinet.
5. Remove pre-amp. power supply plug from tuning chassis.
6. Remove two hex nuts from under pre-amp. mounting board holding pre-amp. chassis in cabinet. Remove from cabinet.
7. Remove loop leads from loop antenna.
8. Remove speaker plugs from speaker.
9. Disconnect phono motor plug.
10. Remove four machine screws holding chassis in cabinet. Remove chassis from cabinet.
11. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

A
B
C
A7
A8
A9
A10
A11
A12
A13

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: GEN. ELECT. PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6AG5	6AG5	7BD	
2	Converter	6BE6	6BE6	7CH	
3	1st IF Amp.	6BA6	6BA6	7BK	
4	2nd IF Amp.	6AU6	6AU6	7BK	
5	Limiter	6AU6	6AU6	7BK	
6	AM-FM Det.-AF Amp.	6S8GT	6S8GT	8CB	
7	Phono Pre-Amp.	6SC7	6SC7	8S	
8	Power Output	6V6GT	6V6GT	7AC	
9	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GEN. ELECT. PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
10A	30	400	RCE-029	AF862J4A	UP43145C	DY403	EL-424	◓ Filter
B	30	400						■ "
C	15	400						▲ "
D	20	25						Cathode Bypass
11A	15	250	RCE-030	AF44F	UP15D35	DY2x15-350	EL253	Pre-Amp. Decoupling
B	15	250						" "
12	.003	1000	RCC-014	1684-003	MD16D3	STM16-003	TR23	Output Plate Bypass
13	.01	200	UCC-630	484-01	DT2S1	ST-4-01	TC11	Output Cathode Bypass
14	.02	500	UCC-631	684-02	DT6S2	ST-6-02	TC12	Audio Coupling
15	.02	600	UCC-631	684-02	DT6S2	ST-6-02	TC12	Limiter Plate Decoup.
16	.003	200	UCC-623	484-003	DT6D3	ST-6-003	TC23	Audio Coupling
17	.007	600	UCC-001	684-0075	DT6D6	ST-6-006	TC27	Tone Compensation
18	.01	200	UCC-630	484-01	DT2S1	ST-4-01	TC11	Audio Coupling
19	.01	600	UCC-630	684-01	DT6S1	ST-6-01	TC11	Limiter Screen Bypass
20	.02	600	UCC-631	684-02	DT6S2	ST-6-02	TC12	2nd IF Decoupling
21	.05	200	UCC-635	484-05	DT2S5	ST-4-05	TC15	2nd IF Cathode Bypass
22	.02	600	UCC-631	684-02	DT6S2	ST-6-02	TC12	1st IF Plate Decoupling
23	.002	200	UCC-621	484-002	DT6D2	ST-6-002	TC22	Tone Compensation
24	.05	600	UCC-635	684-05	DT6S5	ST-6-05	TC15	1st IF Screen Bypass
25	.01	200	UCC-630	484-01	DT2S1	ST-4-01	TC11	1st IF Cathode Bypass
26	.02	600	UCC-631	684-02	DT6S2	ST-6-02	TC12	Converter Screen Bypass
27	.02	600	UCC-631	684-02	DT6S2	ST-6-02	TC12	Converter Plate Decoupler
28	.05	200	UCC-635	484-05	DT2S5	ST-4-05	TC15	AVC Filter
29	.01	600	UCC-630	684-01	DT6S1	ST-6-01	TC11	RF Plate Decoupling
30	.01	600	UCC-630	684-01	DT6S1	ST-6-01	TC11	RF Screen Bypass
31	.05	200	UCC-635	484-05	DT2S5	ST-4-05	TC15	AVC Filter
32	.02	600	UCC-631	684-02	DT6S2	ST-6-02	TC12	Audio Coupling Pre.-Amp.
33	.01	600	UCC-630	684-01	DT6S1	ST-6-01	TC11	Tone Compensation Pre-Amp.
34	.05	600	UCC-635	684-05	DT6S5	ST-6-05	TC15	Audio Coupling Pre-Amp.
35	.05	600	UCC-635	684-05	DT6S5	ST-6-05	TC15	Audio Coupling Pre-Amp.
36	.05	200	UCC-635	484-05	DT2S5	ST-4-05	TC15	Filament Bypass
37	.01	200	UCC-630	484-01	DT2S1	ST-4-01	TC11	" "
38	47	500	UCU-020	1468-00005	5W5Q5	MO.5-45	1FM-45	AF Plate Bypass
39	47	500	UCU-020	1468-00005	5W5Q5	MO.5-45	1FM-45	Tone Compensation
40	470	500	UCU-044	1468-0005	5W5T5	MO.5-35	1FM-35	RF Bypass
41	180	500	UCU-1034	1468-0002	5W5T2	MO.5-32	1FM-32	De-emphasis
42	47	500	UCU-020	1468-00005	5W5Q5	MO.5-45	1FM-45	Diode RF Filter
43	47	500	UCU-020	1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
44	47	300	UCW-1020	1468-00005	5W5Q5	MO.5-45	1FM-45	IF Coupling-Cer.
45	10	300	UCW-2004	1468-00001	5W5Q1	MO.5-41	MS-41	Converter Plate Bypass-Cer
46	470	300	UCW-044	1468-0005	5W5T5	MO.5-35	1FM-35	Converter Screen Byp. "
47	10	300	UCW-2004	1468-00001	5W5Q1	MO.5-41	MS-41	Osc. Grid Cap.-Cer.
48	6	300	RCW-1050	1468-000005	5W5V5	MO.5-55	MS-55	Osc. Feedback-Cer.
49	9	300	RCW-1051					Fixed Trimmer-Cer.
50	22	300	RCW-1053	1468-0000025	5W5Q2	MO.5-425	MS-42	Osc. Grid Cap.-Cer.
51	47	300	UCW-1020	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling-Cer.
52	10	300	UCW-2004	1468-00001	5W5Q1	MO.5-41	MS-41	" " "
53	47	300	UCW-1020	1468-00004	5W5Q5	MO.5-45	1FM-45	Fixed Trimmer-Cer.
54	100	500	UCU-028	1468-0001	5W5T1	MO.5-31	1FM-31	Screen Bypass
55	12	300	UCW-2006	1468-00001	5W5Q1	MO.5-41	MS-41	Osc. Feedback-Cer.
56	3	300	RCW-1048	1468-000005	5W5V5	MO.5-55	MS-55	Ant. Coupling-Cer.
57	47	300	UCW-1020	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling-Cer.
58	20	300	UCW-2011		5R5Q2	MOS.5-42	MS-42	Fixed Trimmer-Cer.
59	47	500	UCU-020	1468-00005	5W5Q5	MO.5-45	1FM-45	Line Ant. Coupling
60	14.5	300	RCW-1049					Fixed Trimmer-Cer.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: GEN. ELECT. PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
112	7500Ω	3.9Ω	525Ω	.4Ω	RTO-040	A-3823	T22S27	A-2901	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: GEN. ELECT. PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.				
113	PM	3.9Ω	UOP-1206	ST-101# Mod. P12-T	12A6#	#Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	VC DIA.				
114	11-7/8"	1"	UOX-005			

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: GEN. ELECT. PART No.	REPLACEMENT DATA: MEISSNER PART No.	
115	Loop Ant.	0Ω	2.2Ω	RLL-027		
116	FM Ant.Coil		0Ω	RHM-038§		
117	BC RF Coil	73Ω	5.2Ω	RLB-024		
118	FM RF Coil		0Ω	RHM-038§		§Two required for each coil.
119	BC Osc.Coil		7.8Ω	RLC-060	14-1060	
120	FM Osc.Coil		0Ω	RHM-038§		
121A	AM 1st IF	10.7Ω*	10.7Ω	RTL-062		*Includes both primaries.
B	FM 1st IF		.2Ω			
122A	AM 2nd IF		25.8Ω†	RTL-063		†Includes both secondaries.
B	FM 2nd IF	.3Ω				
123A	AM 3rd IF	13.6Ω*	13Ω	RTL-064		
B	FM 3rd IF		.4Ω			
124	FM Disc. Trans.	.6Ω	.9Ω	RTD-006		
125	RF Plate Choke		1Ω	RLA-012		
126	Conv. Grid Choke		.9Ω	RLA-012		
127	Conv. Cath. Choke		0Ω	RLF-007		
128	Osc. Grid Choke		1Ω	RLA-012		
129	Filament Choke		0Ω	RLF-007		
130	Filament Choke		.1Ω	RLI-005		
131	"		.1Ω	RLI-005		
132	Line Choke		.1Ω	RLI-044		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: GEN. ELECT. PART No.	REPLACEMENT DATA	INSTALLATION NOTES
133	Bayonet	6-8	0.15	Brown			Type 47
135							

MISCELLANEOUS

ITEM No.	PART NAME	GEN. ELECT. PART No.	NOTES
136	Switch	RSW-048	On-Off/Phono-Radio/Tone
137	"	RCW-047	Band
138	3 Gang Var. Cap.	RCT-028	(40-500MMF, 40-310MMF, 45-160MMF)
	Cabinet	RAV-047	Model 376
	"	RAV-048	Model 377
	"	RAV-049	Model 378
	Dial Scale	RDS-058	
	Dial Pointer	RDX-035	

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	GEN. ELECT. PART No.	IRC PART No.	CLAROSTAT PART No.	
61A	2 Meg.	½	RRC-074	D18-137X	AT-116	Volume Control tapped @ 1 Meg.
B	Shaft		Not Req.	E	KSS-3	Attach to 61A per instructions. Orig. Part #K63J111-3.

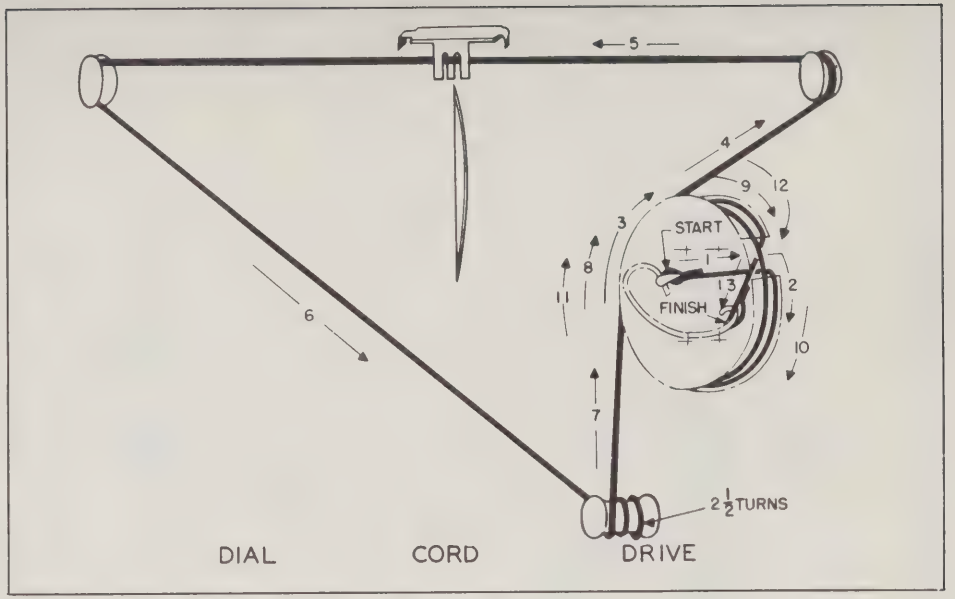
RESISTORS

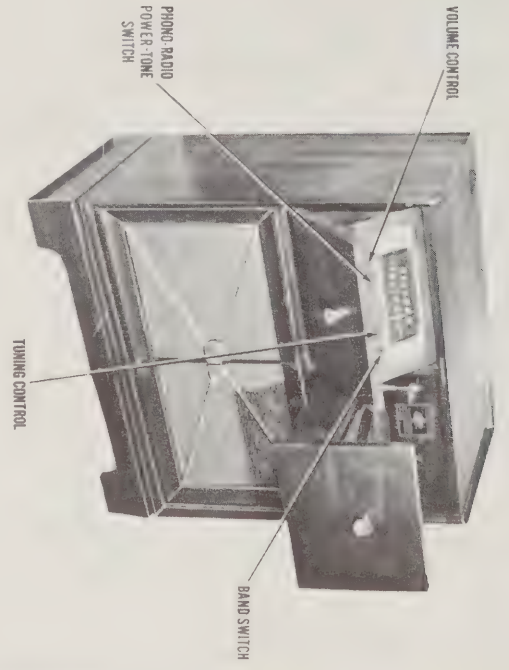
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	GEN. ELECT. PART No.	IRC PART No.	
62	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. RF Grid
63	2.2 Meg.	½	URD-129	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
64	1.5 Meg.	½	URD-125	BTS-1.5 Meg.	Br.-Grn.-Grn. " "
65	33KΩ	½	URD-103	BTS-33K	Or.-Or.-Or. Ant. Loading
66	82KΩ	½	URD-095	BTS-82K	Gray-Red-Or. RF Screen
67	2200Ω	½	URD-057	BTS-2200Ω	Red-Red-Red RF Plate Decoup.
68	22KΩ	½	URD-009	BTS-22KΩ	Red-Red-Or. Osc. Grid
69	1800Ω	½	URD-055	BTS-1800	Br.-Gray-Red Parasitic Supp.
70	10KΩ	½	URD-073	BTS-10K	Br.-Blk.-Or. Conv. Screen
71	2200Ω	½	URD-057	BTS-2200	Red-Red-Red Conv. Plate Decoup.
72	2.2 Meg.	½	URD-129	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
73	68Ω	½	URD-021		Blue-Gray-Blk. 1st IF Cathode
74	47KΩ	½	URD-017	BTS-47K	Yl.-Vi.-Or. 1st IF Screen
75	2200Ω	½	URD-057	BTS-2200	Red-Red-Red 1st IF Plate Decoupling.
76	220Ω	½	URD-033		Red-Red-Br. 2nd IF Cathode
77	22KΩ	½	URD-009	BTS-22K	Red-Red-Or. 2nd IF Decoup.
78	47KΩ	½	URD-017	BTS-47K	Yl.-Vi.-Or. Diode Filter
79	220KΩ	½	URD-105	BTS-220K	Red-Red-Yl. Diode Load
80	47KΩ	½	URD-017	BTS-47K	Yl.-Vi.-Or. Tone Comp.
81	100KΩ	½	URD-097	BTS-100K	Br.-Blk.-Yl. Limiter Grid
82	47KΩ	½	URD-017	BTS-47K	Yl.-Vi.-Or. Limiter Screen Dropping
83	22KΩ	½	URD-009	BTS-22K	Red-Red-Or. Limiter Screen Bleeder
84	6800Ω	½	URD-069	BTS-6800	Blue-Gray-Red Limiter Plate Decoup.
85	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. Discriminator Diode Load
86	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. " " "
87	68KΩ	½	URD-093	BTS-68K	Blue-Gray-Or. De-emphasis
88	10KΩ	½	URD-073	BTS-10K	Br.-Blk.-Or. Tone Comp.
89	100Ω	½	URD-025	BW-½-100	Br.-Blk.-Br. Feedback
90	100KΩ	½	URD-097	BTS-100K	Br.-Blk.-Yl. Tone Comp.
91	6.8 Meg.	½	URD-141	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
92	220KΩ	½	URD-105	BTS-220K	Red-Red-Yl. AF Plate Load
93	6800Ω	½	URD-069	BTS-6800	Blue-Gray-Red Phono Shunt
94	3.3 Meg.	½	URD-133	BTS-3.3 Meg.	Or.-Or.-Grn. 1st Phono Pre-Amp. Grid
95	68KΩ	½	URD-093	BTS-68K	Blue-Gray-Or. 1st Phono Pre-Amp. Plate Load
96	68KΩ	½	URD-093	BTS-68K	Blue-Gray-Or. 1st Phono Pre-Amp. Plate Decoup.
97	3.3 Meg.	½	URD-133	BTS-3.3 Meg.	Or.-Or.-Grn. 2nd Phono Pre-Amp. Grid
98	33KΩ	½	URD-013	BTS-33K	Or.-Or.-Or. 2nd Phono Pre-Amp. Plate Load
99	33KΩ	½	URD-013	BTS-33K	Or.-Or.-Or. 2nd Phono Pre-Amp. Plate Decoup.
100	200KΩ	½	URD-1104	BTS-200K	Red-Blk.-Yl. Tone Comp.
101	68KΩ	½	URD-093	BTS-68K	Blue-Gray-Or. " "
102	27KΩ	½	URD-083	BTS-27K	Red-Vi.-Or. " "
103	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. Output Grid
104	330Ω	1	URE-037	BT-1-330	Or.-Or.-Br. Output Cathode
105	1000Ω	½	URD-049	BTS-1000	Br.-Blk.-Red Tone Comp.
106	1500Ω	½	URD-053	BTS-1500	Br.-Grn.-Red Feedback
107	47KΩ	½	URD-017	BTS-47K	Yl.-Vi.-Or. Tone Comp.
108A	5000Ω	10	RRW-010	AB-5000	Filter
B	1150Ω	10		AB-1250	"
109	2.2Ω	½	RRN-006	BW-½-2.2	Red-Red-Gold Series Pilot Lights
110	470Ω	½	URD-041	BTS-470	Yl.-Vi.-Br. Loop Loading

TRANSFORMER (POWER)

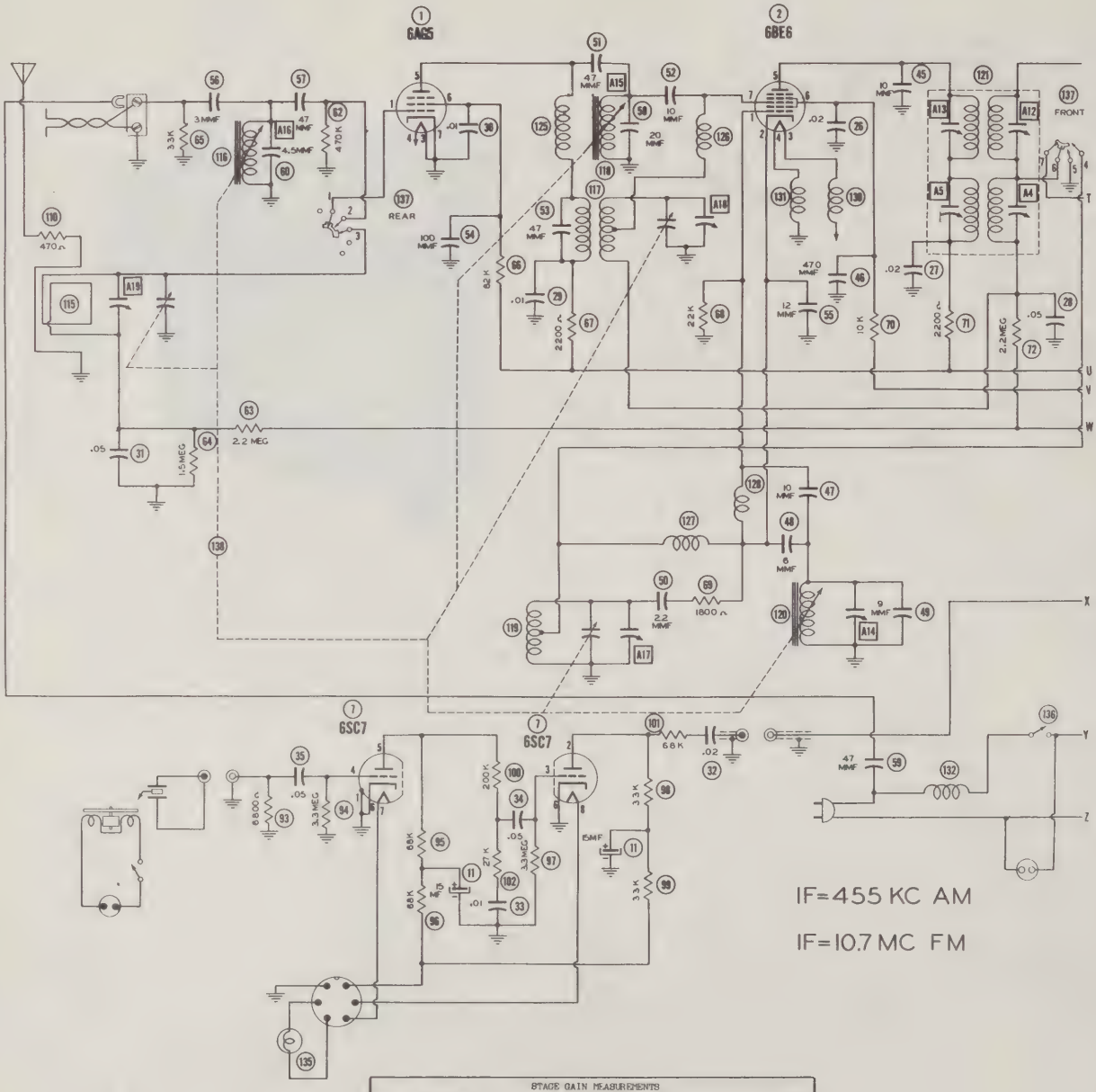
ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	GEN. ELECT. PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
111	117V AC @ .65A	2.5V CT @ 3.0A	6.3V AC @ 2.0A	6.3V AC @ 2.5A	RTP-1053	P-8312	T20R24	P-2052‡

‡Add series resistor to reduce plate voltage.





DATE 9/49-#4815-11 SET #45-FOLDER #11



STAGE GAIN MEASUREMENTS			
ANTENNA TO RF GRID	3X		600KC
RF GRID TO CONV. GRID	2X		600KC
CONVERSION GAIN	20X	IN OUT	600KC 455KC
INPUT IF TRANS.	.6X		455KC
1st IF GRID TO 2nd IF GRID	6X		455KC
2nd IF TUBE	100X		455KC
OUTPUT IF	.4X		455KC
AUDIO	35X		400 ∿
OUTPUT	28X		400 ∿
PHONO PRE-AMP.	20X		400 ∿
PHONO PRE-AMP.	20X		400 ∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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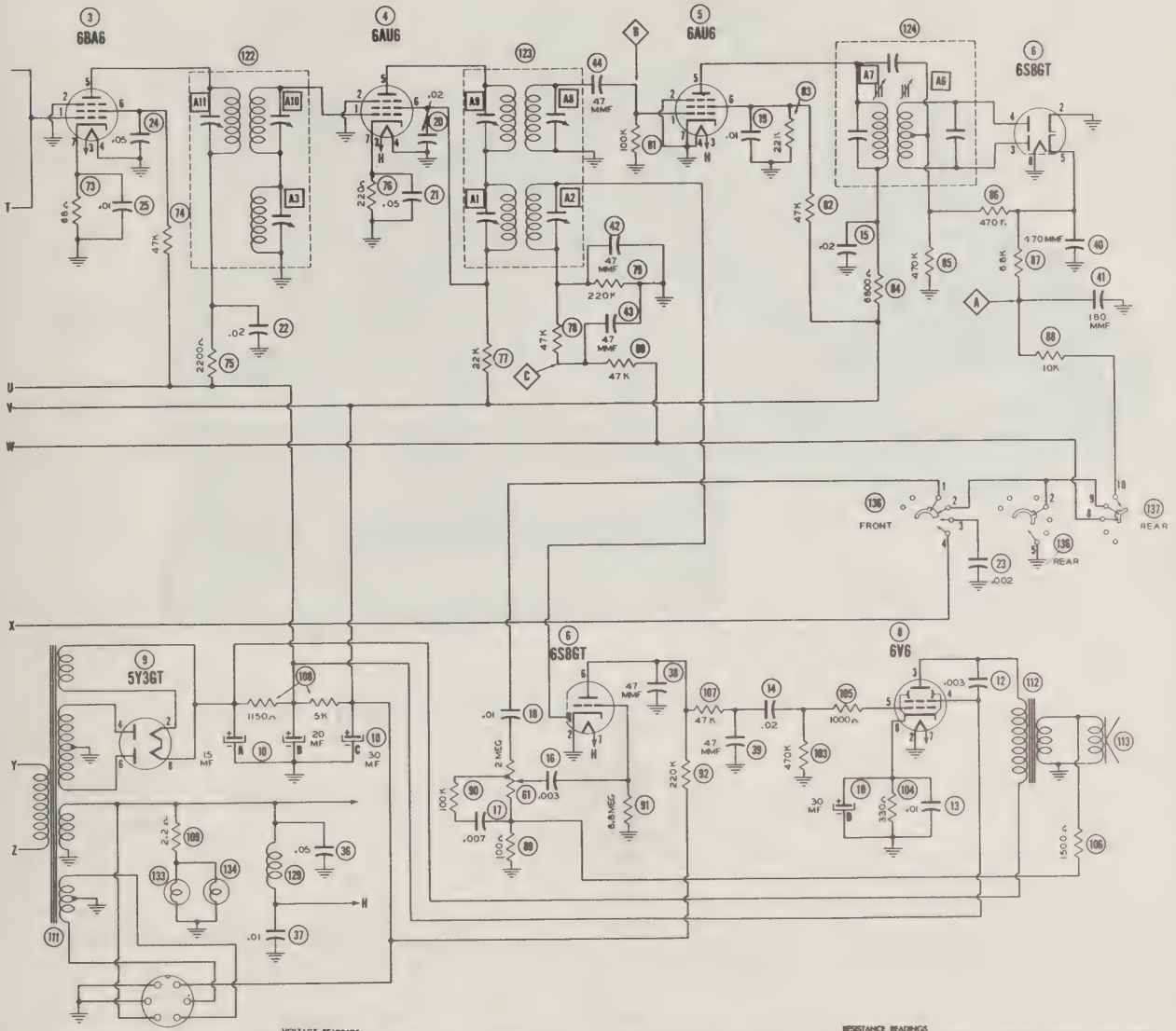

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6AG5	0V.	0V.	0V.	6.5VAC	250VDC	90VDC	0V.	-	-
2	6BE6	-7.8VDC	0V.	6.5VAC	0V.	250VDC	100VDC	-.2VDC	-	-
3	6BA6	0V.	0V.	6.5VAC	0V.	250VDC	100VDC	.8VDC	-	-
4	6AU6	0V.	0V.	6.5VAC	0V.	80VDC	80VDC	1.2VDC	-	-
5	6AU6	0V.	0V.	6.5VAC	0V.	80VDC	80VDC	0V.	-	-
6	6S8GT	-.4VDC	0V.	-4VDC	-.5VDC	.2VDC	80VDC	6.5VAC	0V.	-.6VDC
7	6SC7	0V.	90VDC	-.4VDC	-.4VDC	80VDC	0V.	3.2VAC	3.2VAC	-
8	6V6GT	0V.	0V.	300VDC	260VDC	0V.	0V.	6.5VAC	14VDC	-
9	5Y3GT	0V.	320VDC	0V.	310VAC	0V.	310VAC	0V.	320VDC	-

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6AG5	1.5 Meg.	0Ω	0Ω	.1Ω	62KΩ	140KΩ	0Ω	-	-
2	6BE6	22KΩ	0Ω	.2Ω	.1Ω	62KΩ	75KΩ	2.5 Meg.	-	-
3	6BA6	.2Ω	0Ω	.1Ω	0Ω	62KΩ	120KΩ	6Ω	-	-
4	6AU6	25.8Ω	0Ω	.1Ω	0Ω	85KΩ	85KΩ	220Ω	-	-
5	6AU6	100KΩ	0Ω	.1Ω	0Ω	50KΩ	23KΩ	0Ω	-	-
6	6S8GT	180KΩ	0Ω	470KΩ	470KΩ	900KΩ	280KΩ	.1Ω	0Ω	6.8 Meg.
7	6SC7	0Ω	130KΩ	3.3 Meg.	3.3 Meg.	200KΩ	0Ω	.05Ω	.05Ω	-
8	6V6GT	0Ω	0Ω	60KΩ	62KΩ	470KΩ	440KΩ	.1Ω	330Ω	-
9	5Y3GT	INF.	60KΩ	INF.	135Ω	INF.	125Ω	INF.	60KΩ	-

STAKEN WITH VACUUM TUBE VOLTMETER

RADIO-PHONO SWITCH IN RADIO POSITION.
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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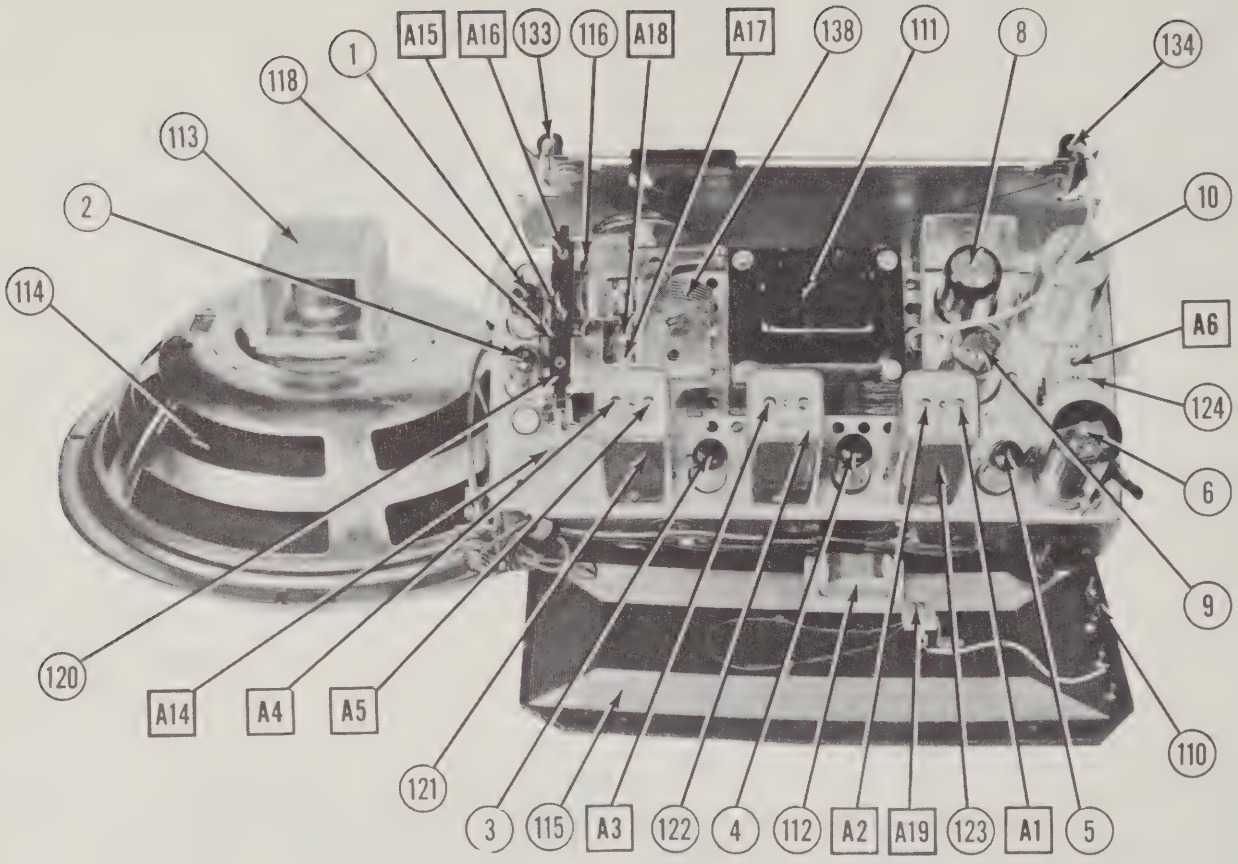
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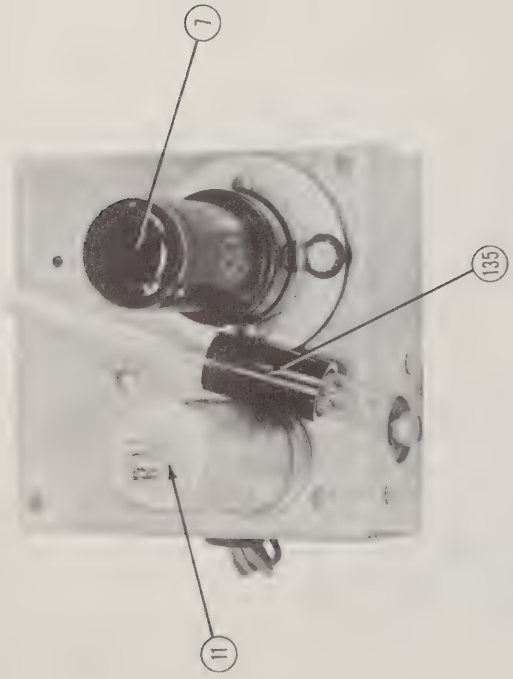
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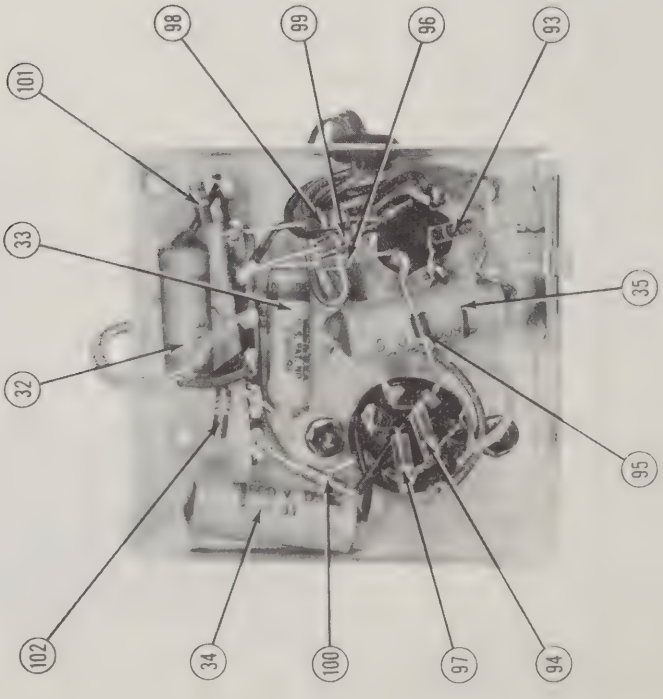
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GILFILLAN MODELS
58M, 58W

VOLUME CONTROL
ON-OFF SWITCH

TUNING CONTROL

GILFILLAN MODELS
58M, 58W

GILFILLAN MODEL 58W

TRADE NAME	Gilfillan, Model 58M, 58W
MANUFACTURER	Gilfillan Bros., Inc., 1815 Venice Blvd., Los Angeles, Calif.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Ant.
TUBES (FIVE)	Types, 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50L6GT Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600KC RATING .22 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to Pin 7 (grid) of 12BE6. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1500KC	1500KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	"	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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DATE 9/48-#4815-12 SET #45-FOLDER #12

PARTS LIST AND DESCRIPTIONS

GILFILLAN MODEL 58W

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: GILFILLAN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GILFILLAN PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	20	150			EDL4215	DSB-302		Filter-Green
B	30	150			BR2015	M-20-150		" -Red
C	20	150						" -Green
D	25	25						" -Yellow
7	.05	400		484-.05	DT4S5	ST-4-05	TC-15	Line Filter
8	.1	200		484-.1	DT2P1	ST-2-1	72P2	Line Isolation
9	.02	400		484-.02	DT4S2	ST-4-02	TC-12	Output Plate Bypass
10	.01	200		484-.01	DT2S1	ST-4-01	TC-11	Audio Coupling
11	.002	600		684-.002	DT6D2	ST-6-002	TC-22	" "
12	.1	200		484-.1	DT2P1	ST-2-1	TC-1	AVC Filter
13	.002	400		484-.002	DT4D2	ST-4-002	TC-22	Tone Comp.-See Note
14	500	300		1468-.0005	5W5T5	MO.5-35	1FM-35	AF Plate Bypass-Cer.
15	250	500		1468-.00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
16	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
17	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Ant. Coupling-See Note
39	.25	200		484-.25	DT2P25	ST-2-25	TC-2	RF Bypass Power Supply-See Note

Note-Not used in all models.

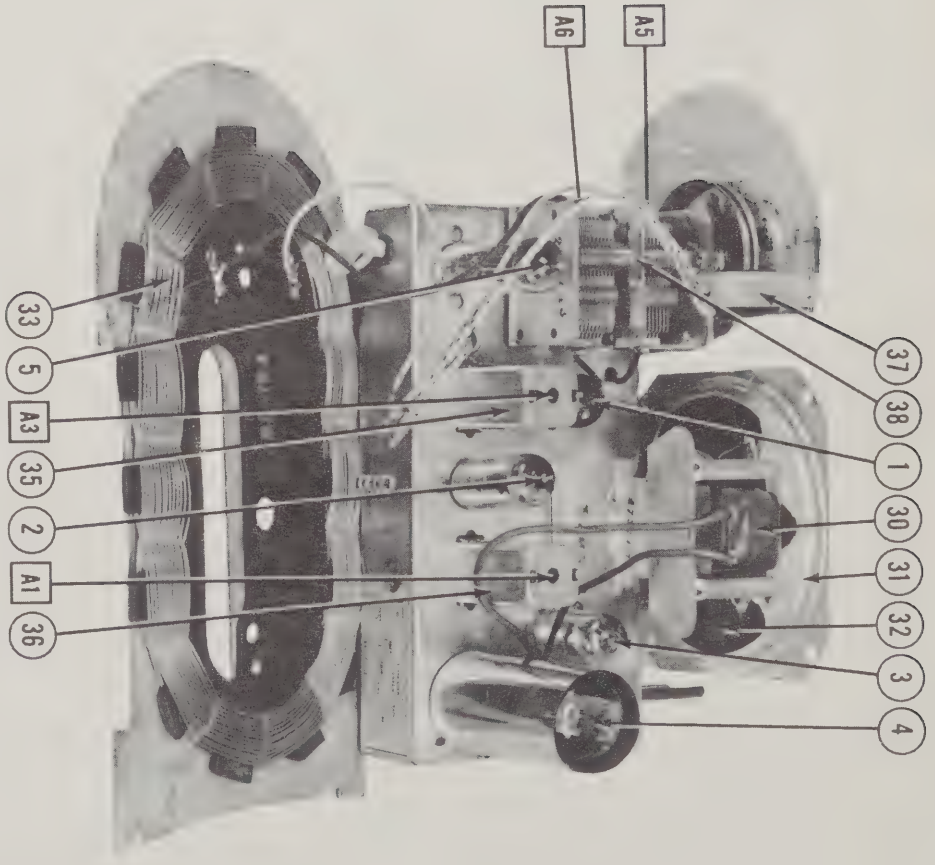
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GILFILLAN PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
18A	500KΩ	½	58-8	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 17A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GILFILLAN PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
19	33KΩ	½		BTS-33K	Or.-Or.-Or. Oscillator Grid
20	15 Meg.	½		BTS-15 Meg	Br.-Grn.-Grn. AVC Network
21	2.2 Meg.	½		BTS-2.2 Meg	Red-Red-Grn. AVC Network
22	100Ω	½		BW-½-100	Br.-Blk.-Br. IF Cathode
23	4.7 Meg.	½		BTS-4.7 Meg	Yl.-Vi.-Grn. AF Grid
24	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Plate Load
25	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
26	220Ω	½		BW-½-220	Red-Red-Br. Output Cathode
27	1500Ω	1		BTA-1500	Br.-Grn.-Red Filter
28	120Ω	1		BW-1-120	Br.-Red-Br. "
38	220KΩ	½		BTS-220K	Red-Red-Yl. Line Isolation

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		GILFILLAN PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
30	2900Ω	3.3Ω	205Ω	.4Ω		A-3876‡	T22847‡	A-2928‡	‡Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			GILFILLAN PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-113#		#Fabricate new mounting bracket.
31	PM	3.3Ω		Mod. P4-X	4A07#	
	CONE DIA.	VC DIA.				
32	4"	9/16"				

R F COILS

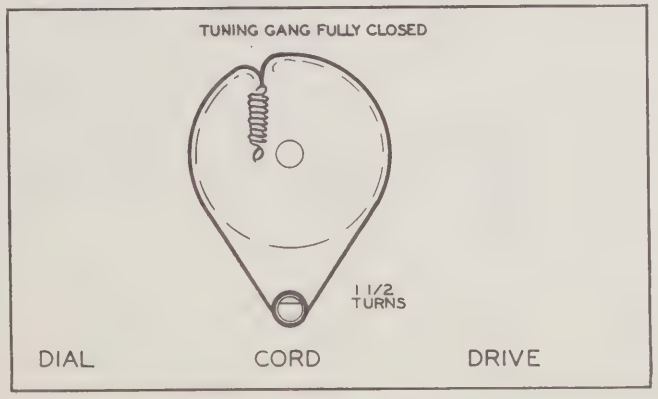
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	GILFILLAN PART No.	MEISSNER PART No.	
33	Loop Ant.	*	1.2Ω	58-4		*Some models use tap on loop for ext. ant. connection.
34	Osc. Coil	1.2Ω	8.1Ω	58-3	14-1060	
35	Input IF	24.4Ω	24.2Ω	1465-11	16-6678	
36	Output IF	18.2Ω	18.2Ω	1465-16	16-6678	

DIAL LIGHT

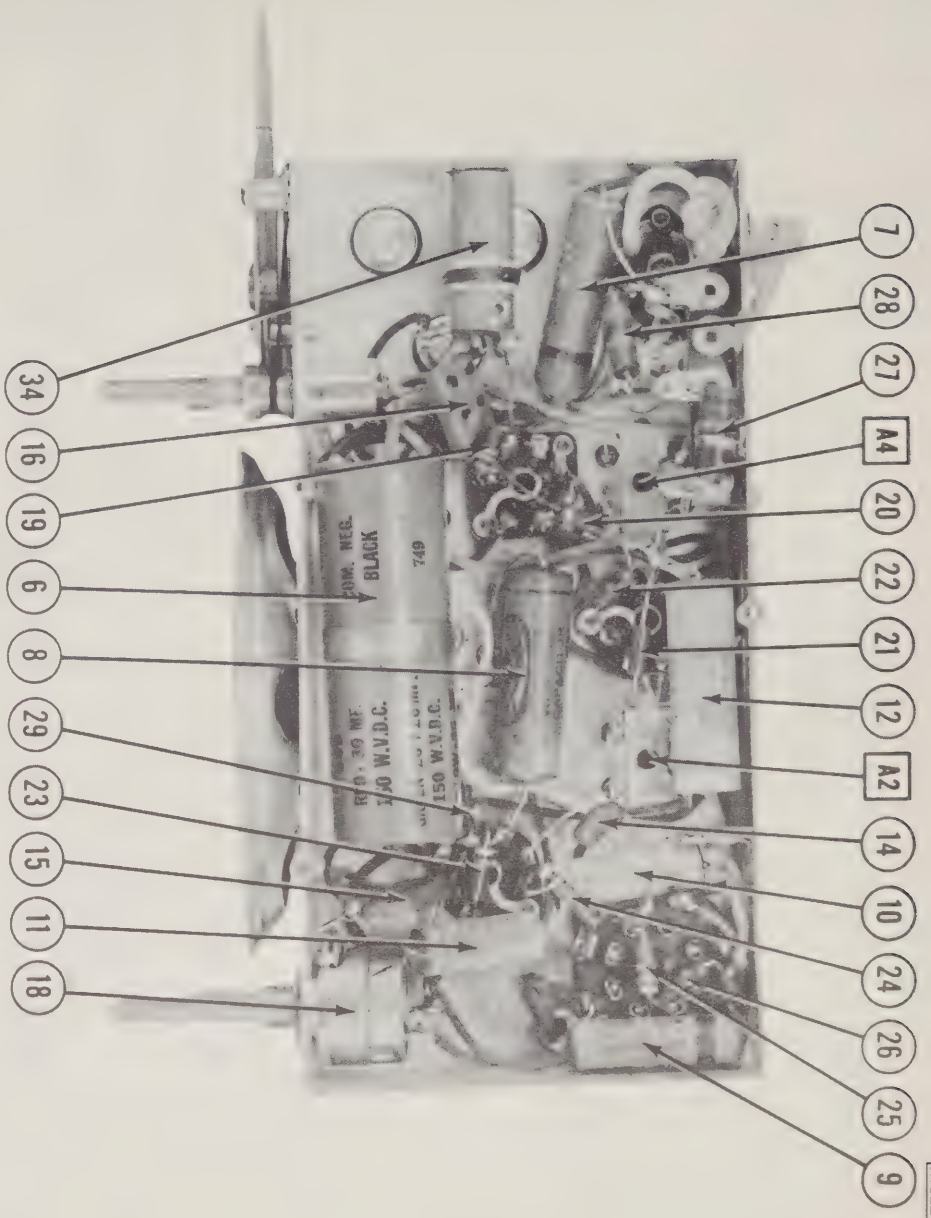
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					GILFILLAN PART No.		
37	Bayonet	6-8	0.15	Brown	TS-47		Type 47

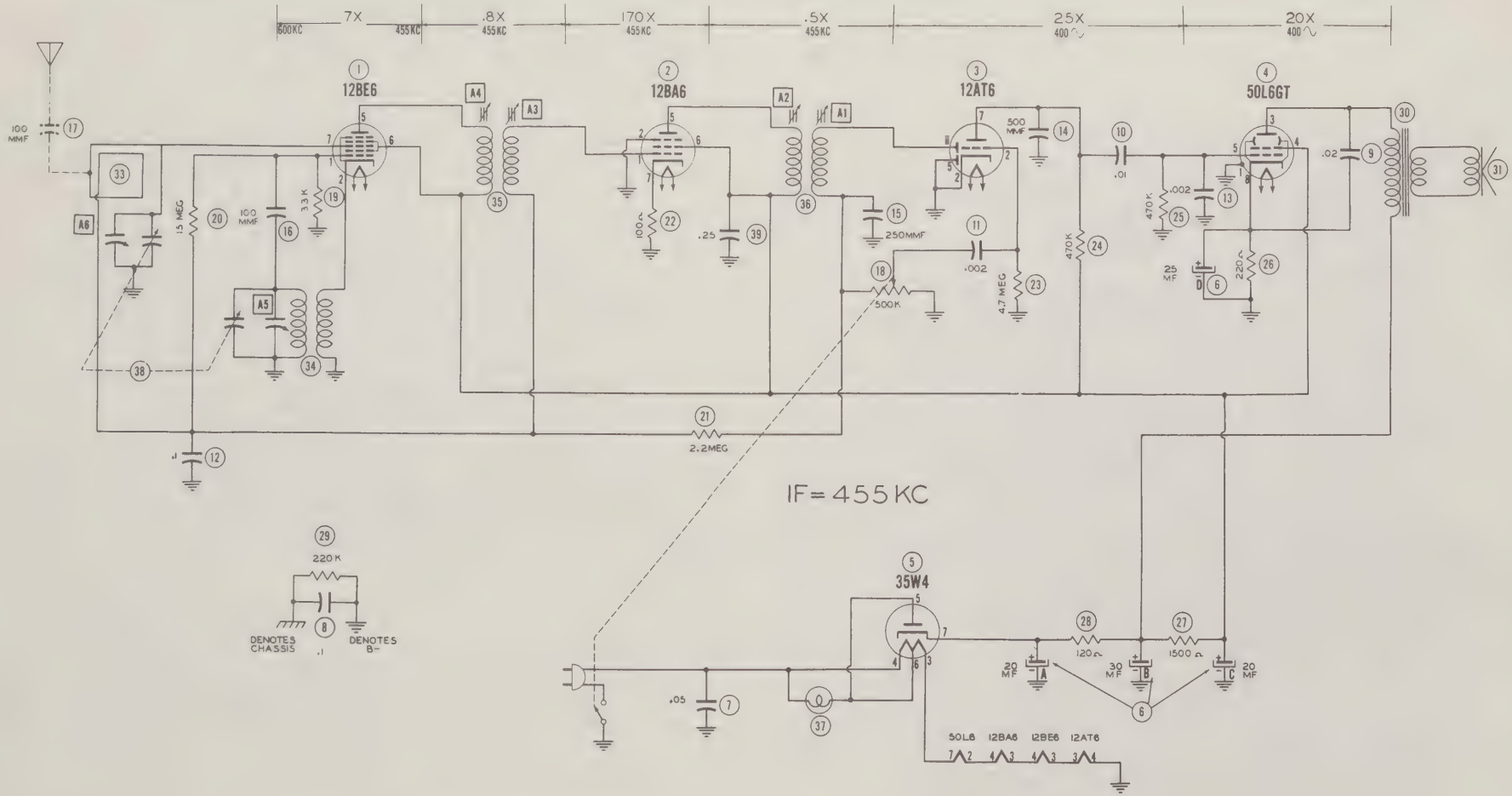
MISCELLANEOUS

ITEM No.	PART NAME	GILFILLAN PART No.	NOTES
38	2 Gang Var. Cap.	CN825171	(30-460MMF, 30-195MMF)
	Dial Plate	58-2	Calibrated



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12BE6	-14VDC§	0V.	13VAC	27VAC	95VDC	95VDC	-.3VDC	-
2	12BA6	-.2VDC	0V.	27VAC	33VAC	95VDC	95VDC	.5VDC	-
3	12AT6	-.5VDC	0V.	13VAC	0V.	0V.	-.5VDC	34VDC	-
4	50L6GT	0V.	38VAC	110VDC	95VDC	0V.	120VDC	90VAC	7.8VDC
5	35W4	125VDC	0V.	90VAC	117VAC	112VAC	112VAC	125VDC	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12BE6	33KΩ	1.2Ω	13Ω	26Ω	42KΩ	42KΩ	2.7 Meg.	-
2	12BA6	2.7 Meg.	0Ω	26Ω	38Ω	42KΩ	42KΩ	100Ω	-
3	12AT6	4.7 Meg.	0Ω	13Ω	0Ω	0Ω	500KΩ	510KΩ	-
4	50L6GT	0Ω	38Ω	40KΩ	42KΩ	470KΩ	40KΩ	85Ω	220Ω
5	35W4	40KΩ	0Ω	95Ω	110Ω	105Ω	105Ω	40KΩ	-

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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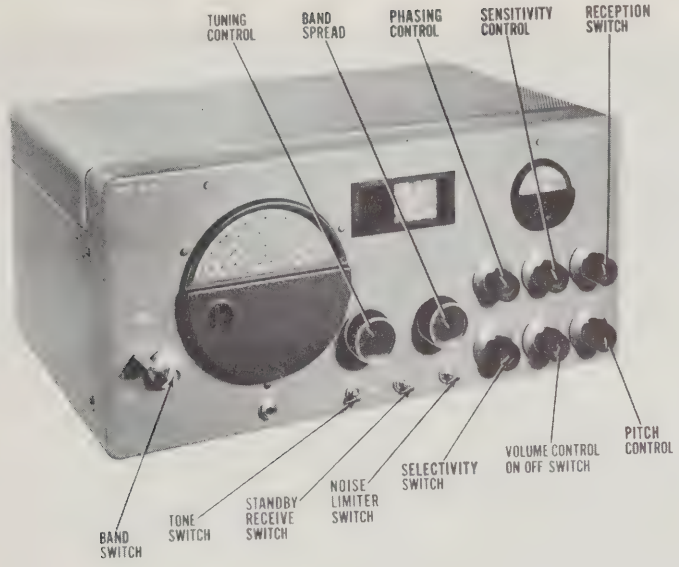
4815-12

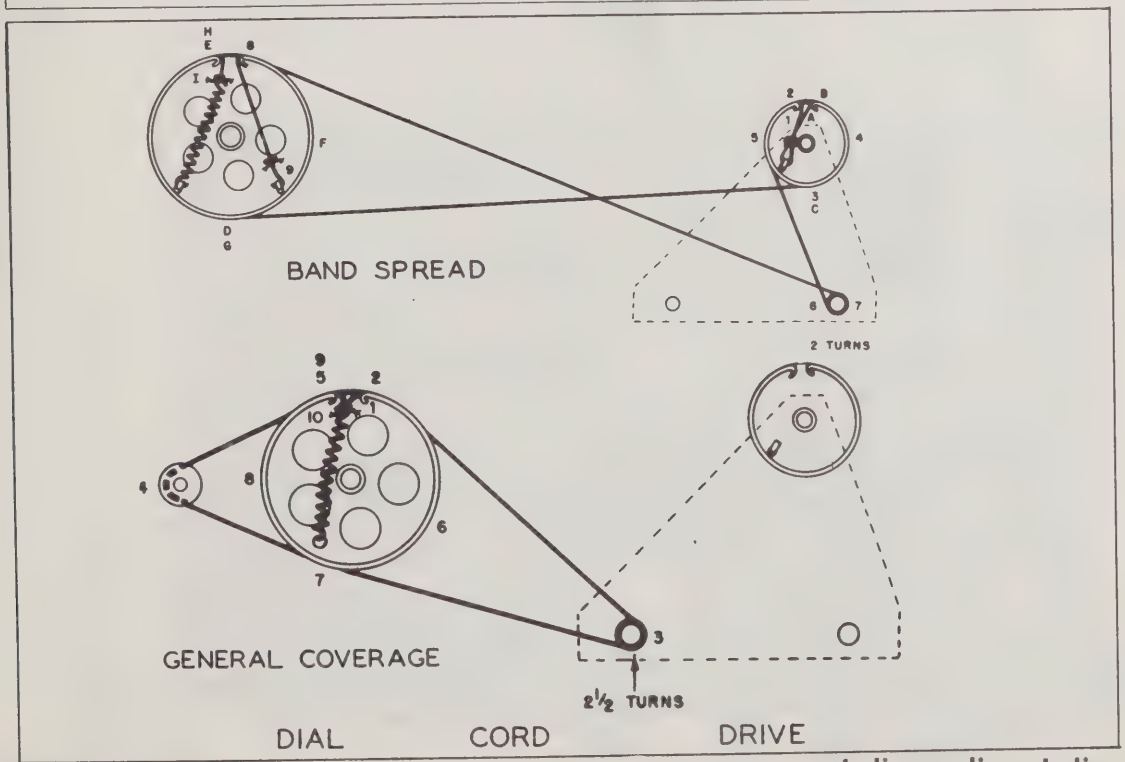
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



HALLICRAFTERS MODEL SX-43

TRADE NAME	Hallicrafters, Model SX-43
MANUFACTURER	Hallicrafters Co., 5th & Kostner Avenues, Chicago 24, Ill.
TYPE SET	AC Operated Multi-Band AM-FM Commercial Communications Receiver
TUBES (ELEVEN)	Types, 6BA6 RF Amp., 7F8 Converter, 6SG7 1st IF Amp., 6SH7 2nd IF-2nd Mixer, 6SH7 3rd IF Amp., 6AL5 FM Ratio Det., 6H6 AM Det., 6J5 BFO-2nd Osc., 6SQ7 AF Amp., 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.68 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1700KC SHORT WAVE 1.7-5MC, 5-16MC, 14-14.4MC, 15.5-44MC, 44-55MC FREQ. MOD. 44-55MC, 86-109MC



HALLICRAFTERS MODEL
SX-43

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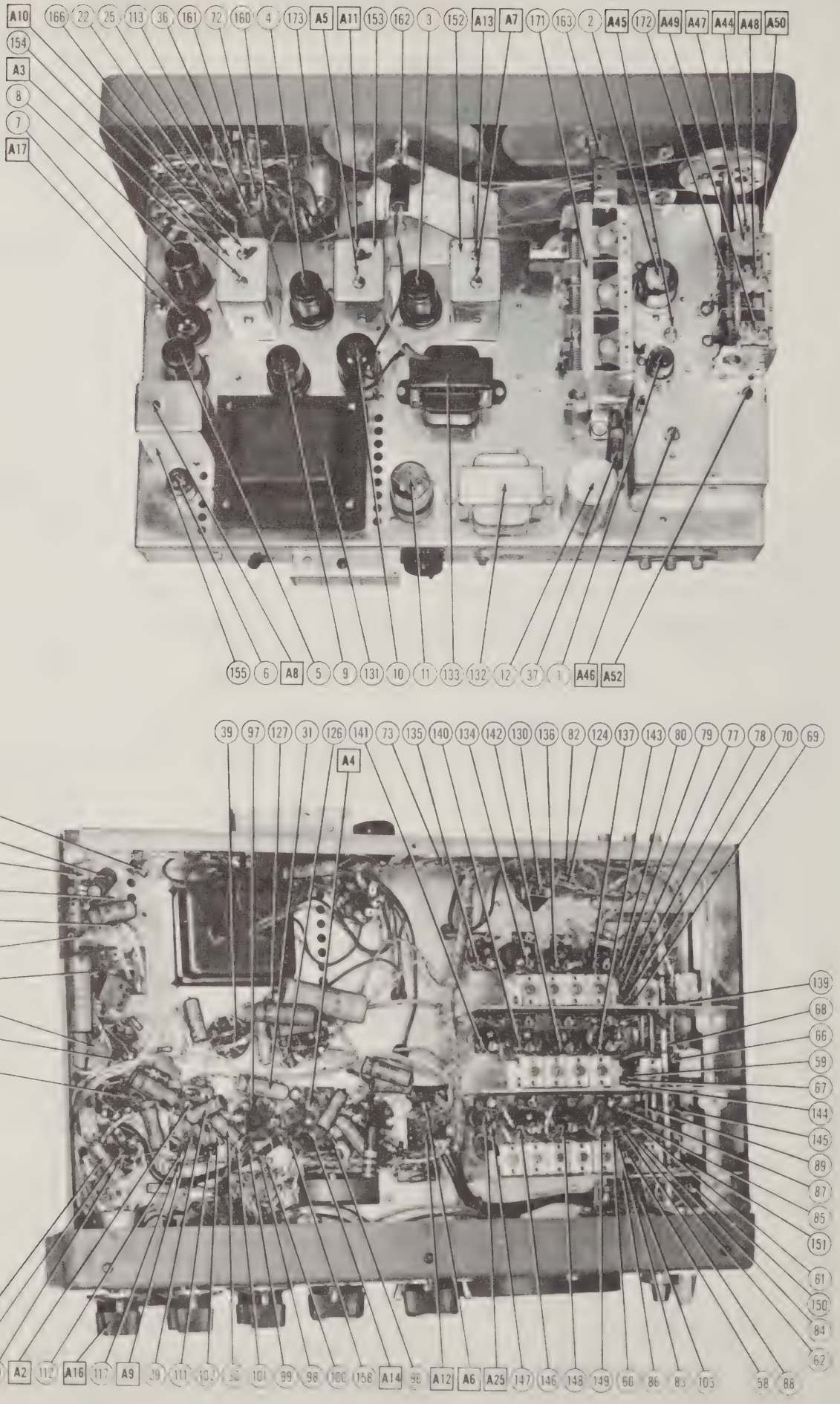
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: HALLICRAFTERS PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	7F8	7F8	8BW	
3	1st IF Amp.	6SG7	6SG7	8BK	
4	2nd IF-2nd Mixer	6SH7	6SH7	8BK	
5	3rd IF Amp.	6SH7	6SH7	8BK	
6	FM Ratio Det.	6AL5	6AL5	6BT	
7	AM Det.	6H6	6H6	7Q	
8	BFO-2nd Osc.	6J5	6J5	6Q	
9	AF Amp.	6SQ7	6SQ7	8Q	
10	Power Output	6V6GT	6V6GT	7AC	
11	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: HALLICRAFTERS PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
12A	60	450	45B113	AF444J	UP222245	DY-3x20-450	EL-420	◓ Filter
B	20	450						■ "
C	20	400		PRS450-40	BR2045	M-40-450	UT-20	▲ "
13	10	25	42A033	PRS25-10	BR102A	M-10-25	TA-25	Cathode Bypass
14	.01	400	46AW103J	484-01	DT4S1	MPH-4-01	TC-11	Line Filter
15	.005	600	46AY502J	684-005	DT6D5	ST-6-005	TC-25	Tone Compensation
16	.02	600	46AY203J	684-02	DT6S2	ST-6-02	TC-12	" "
17	.005	600	46AY502J	684-005	DT6D5	ST-6-005	TC-25	" "
18	.1	200	46AU104J	484-.1	DT2P1	ST-2-1	TC-1	Filament Bypass
19	.05	600	46AY503J	684-05	DT6S5	ST-6-05	TC-15	Output Screen Bypass
20	.02	400	46AW203J	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
21	.005	400	46AW502J	484-005	DT4D5	ST-6-005	TC-25	" "
22	.02	400	46AW203J	484-02	DT4S2	ST-4-02	TC-12	" "
23	.05	200	46AU503J	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
24	.02	400	46AW203J	484-02	DT2S2	ST-4-02	TC-12	Audio Coupling
25	.01	400	46AW103J	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
26	.05	200	46AU503J	484-05	DT4S5	ST-4-05	TC-15	Diode Load Cap.
27	.05	200	46AU503J	484-05	DT2S5	ST-4-05	TC-15	" " "
28	.25	400	46AU254J	484-.25	DT2P25	ST-4-25	TC-2	3rd IF Screen Bypass
29	.01	400	46AW103J	484-01	DT4S1	ST-4-01	TC-11	2nd IF Plate Decoupling
30	.01	400	46AW103J	484-01	DT4S1	ST-4-01	TC-11	2nd IF Screen Bypass
31	.05	200	46AU503J	484-05	DT2S5	ST-4-05	TC-15	2nd IF Cathode Bypass
32	.01	400	46AW103J	484-01	DT4S1	ST-4-01	TC-11	1st IF Plate Decoupling
33	.01	400	46AW103J	484-01	DT4S1	ST-4-01	TC-11	1st IF Screen Bypass
34	.01	400	46AW103J	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
35	.01	400	46AW103J	484-01	DT4S1	ST-4-01	TC-11	Conv. Plate Decoupling
36	.02	400	46AW203J	484-02	DT4S2	ST-4-02	TC-12	RF Gain Control Bypass
37	.05	200	46AU503J	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
38	.05	200	46AU503J	484-05	DT2S5	ST-4-05	TC-15	1st IF Cathode Bypass
39	100	500	CC25UK101K	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass-Cer.
40	100	500	CC25UK101K	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.
41	100	500	CC25UK101K	1468-0001	5W5T1	MO.5-31	1FM-31	" " " "
42	10000	350	47A167	684-01	DT6S1	ST-6-01	TC-11	BFO Coupling - Cer.
43	270	500	CM20A271J	1468-0003	5W5T3	MO.5-33	1FM-33	Fixed Trimmer
44	100	500	CC25UK101K	1468-0001	5W5T1	MO.5-31	1FM-31	BFO Grid Cap.-Cer.
45	470	500	CM20A471J	1468-0005	5W5T5	MO.5-35	1FM-35	Fixed Trimmer
46	2	500	47A160-4					2nd Osc. Coupling-Cer.
47	1000	500	CM20A102K	1467-001	1W5D1	MW.5-21	1FM-21	RF Bypass
48	1000	500	CM20A102K	1467-001	1W5D1	MW.5-21	1FM-21	De-emphasis
49	5000	450	47A168	684-005	1D5D5	MW.5-25	1FM-25	3rd IF Decoupling-Cer.
50	220	500	CM20A221K	1468-00025	5W5T25	MO.5-325	1FM-325	IF Coupling
51	5000	400	47A168	684-005	1D5D5	MW.5-25	1FM-25	RF Gain Control Byp.-Cer.
52	5000	450	46AW502J	684-005	1D5D5	MW.5-25	1FM-25	" " " " "
53	820	500	CM25A821K	1479-0008	1W5T8	MW.5-38	1FM-38	Diode RF Filter
54	22	500	CM20A220K	1468-000025	5W5Q25	MO.5-425	MS-42	RF Coupling
55	15	500	CC20UK150K				MS-415	Fixed Trimmer-Cer.
56	22	500	CM20A220K	1468-000025	5W5Q25	MO.5-425	MS-42	Conv. Plate Bypass
57	1500	350	47A161	1467-001	1W5D15	MW.5-215	1FM-215	RF Byp. Power Supply-Cer. See Note
58	10000	350	47A167	484-01	DT6S1	ST-6-01	TC-11	Conv. Cathode Byp.-Cer.
59	220	500	CM20B221K	1468-00025	5W5T25	MO.5-325	1FM-325	RF Coupling

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: HALLICRAFTER PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
112	2.2 Meg.	½	RC20AE225K	BTS-2.2 Meg	Red-Red-Grn. AVC Network
113	150Ω	½	RC20AE151K		Br.-Grn.-Br. AVC Shunt
114	2.7 Meg.	½		BTS-2.7 Meg	Red-Vi.-Grn. Noise Limiter Load
115	82KΩ	½	RC20AE823K	BTS-82K	Gray-Red-Or. Diode Load
116	1 Meg.	½	RC20AE105K	BTS-1 Meg.	Br.-Blk.-Grn. Noise Limiter Bias Network
117	250KΩ	½	23BX2543	BTS-270K	Red-Grn.-Yl. Diode Load
118	1 Meg.	½	RC20AE105K	BTS-1 Meg.	Br.-Blk.-Grn. Noise Limiter Bias Network
119	47KΩ	½	RC20AE473K	BTS-47K	Yl.-Vi.-Or. BFO Grid
120	15KΩ	1	RC30AE153K	BTA-15K	Br.-Grn.-Or. BFO Plate
121	470KΩ	½	RC20AE474K	BTS-470K	Yl.-Vi.-Yl. Phono Shunt
122	15 Meg.	½	RC20AE156K	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
123	220KΩ	½	RC20AE224K	BTS-220K	Red-Red-Yl. AF Plate Load
124	1000Ω	1	RC30AE102K	BTA-1000	Br.-Blk.-Red Output Screen Dropping
125	470KΩ	½	RC20AE474K	BTS-470K	Yl.-Vi.-Yl. Output Grid
126	270Ω	1	RC30AE271K	BW-1-270	Red-Vi.-Br. Output Cathode
127	33KΩ	1	RC30AE333K	BTA-33K	Or.-Or.-Or. Tone Comp.
128	1000Ω	1	RC30AE102K	BTA-1000	Br.-Blk.-Red " "
129	470Ω	1	RC30AE471K	BTA-470	Yl.-Vi.-Br. Head phones shunt
130	4700Ω	1	RC30AE472K	BTA-4700	Yl.-Vi.-Red Filter

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: HALLICRAFTERS PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
131	117V AC @ .74A	530V CT .100A DC	5.2V AC @ 2.0A	6.3V AC @ 4.0A	52C143	P-6313		P-2953#

#Add series resistor to reduce plate voltage.

FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE @ CURRENT 1000 ∿	REPLACEMENT DATA: HALLICRAFT. PART NO.	REPLACEMENT DATA: STANCOR PART NO.	REPLACEMENT DATA: THORDARSON PART NO.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
132	.052A DC	290Ω	17 Henries	56B067	C-1709	T20C53	C-2990†	†Drill one new mounting hole.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: HALLICRAFT. PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
133	4000Ω	5000Ω 500Ω	360Ω	310Ω 36Ω	55B095				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: HALLICRAFTERS PART No.	REPLACEMENT DATA: MEISSNER PART No.
	Band				
134	Ant.Coil 1	26Ω	5Ω	51B928	
135	" " 2	1.5Ω	.3Ω	51B927	
136	" " 3	.2Ω	.1Ω	51B926	
137	" " 4	.1Ω	0Ω	51B925	
138	" " 5	0Ω	0Ω	51B924	
139	" " 6	0Ω	0Ω	51B923	
140	RF Coil 1	.3Ω	.1Ω	51B934	
141	" " 2	.2Ω	.1Ω	51B933	
142	" " 3	.6Ω	.1Ω	51B932	
143	" " 4	.2Ω	0Ω	51B931	
144	" " 5	0Ω	0Ω	51B930	
145	" " 6	0Ω	0Ω	51B929	
146	Osc. " 1	5.3Ω	.1Ω	51B935	
147	" " 2	1.6Ω	.1Ω	51B936	
148	" " 3	.4Ω	.1Ω	51B937	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	HALLICRAFTER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
60	Temp.	Comp.	44A158					Osc. Plate Bypass
61	51	500	CC20UK510K	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
62	100	500	CC25UK101K	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Coupling-Cer.
63	3900	500	CM35A392J					Fixed Pad.
64	1500	500	CM30A152J	1464-0015	1R5D15	MW.5-215	" "	" "
65	15	500	CC20UK150K				MS-415	Fixed Trimmer-Cer.
66	25	500	47A141	1468-000025	5W5Q25	MO.5-425	MS-425	RF Coupling-Cer.
67	25	500	47A141	1468-000025	5W5Q25	MO.5-425	MS-425	" " "
68	1500	350	47A61	1467-0015	1W5D15	MW.5-215	1FM-215	RF Decoupling-Cer.
69	1500	350	47A61	1467-0015	1W5D15	MW.5-215	1FM-215	RF Screen Bypass-Cer.
70	10000	350	47A167	684-01	DT6S1	ST-6-01	TC-11	RF Cathode Bypass-Cer.

Note-Not used in some models.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	HALLICRAFT. PART No.	IRC PART No.	CLAROSTAT PART No.	
71A	2 Meg.	½	25B601	D13-139	M-66-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 71A per instructions
C	Switch		" "	41	SW-A	" " " " "
72A	10KΩ	½	25B577	D16-116	M-30-V	Sensitivity Control
B	Shaft		Not Req.	A	Not Req.	Attach to 72A per instructions
73	500Ω	1	25A569	W-500	43-500	"S" Meter Control

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	HALLICRAFTER PART No.	IRC PART No.	
74	47Ω	½	RC20AE470K		Yl.-Vi.-Blk. Ant. Loading
75	27Ω	½	RC20AE270K		Red-Vi.-Blk. Parasitic Suppressor
76	1 Meg.	½	RC20AE105K	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
77	5.6Ω	½	23A011		Grn.-Blue-Gold Par. Suppressor
78	68Ω	½	RC20AE680K		Blue-Gray-Blk. RF Cathode
79	27KΩ	1	RC30AE273K	BTA-27K	Red-Vi.-Or. Bleeder
80	15KΩ	2	RC40AE153K	BT-2-15K	Br.-Grn.-Or. RF Screen Dropping
81	5.6Ω	½	23A011		Grn.-Blue-Gold Par. Suppressor
82	1000Ω	½	RC20AE102K	BTS-1000	Br.-Blk.-Red Decoupling
83	47Ω	½	RC20AE470K		Yl.-Vi.-Blk. Par. Suppressor
84	33Ω	½	RC20AE330K		Or.-Or.-Blk. " "
85	22KΩ	½	RC20AE223K	BTS-22K	Red-Red-Or. Osc. Grid
86	10KΩ	1	RC30A3103K	BTA-10K	Br.-Blk.-Or. Osc. Plate Load
87	2.2 Meg.	½	RC20AE225K	BTS-2.2 Meg.	Red-Red-Grn. Conv. Grid
88	1000Ω	½	RC20AE102K	BTS-1000	Br.-Blk.-Red Conv. Cathode
89	15Ω	½	RC20AE150K		Br.-Grn.-Blk. Par. Suppressor
90	10Ω	½	RC20AE100K		Br.-Blk.-Blk. " "
91	47KΩ	1	RC30AE473K	BTA-47K	Yl.-Vi.-Or. Conv. Plate Dropping
92	22KΩ	½	RC20AE223K	BTS-22K	Red-Red-Or. Bleeder
93	82Ω	½	RC20AE820K		Gray-Red-Blk. 1st IF Cathode
94	15KΩ	2	RC40AE153K	BT-2-15K	Br.-Grn.-Or. 1st IF Screen
95	27KΩ	1	RC30AE273K	BTA-27K	Red-Vi.-Or. Bleeder
96	3300Ω	½	RC20AE332K	BTS-3300	Or.-Or.-Red 1st IF Plate Decoupling
97	1 Meg.	½	RC20AE105K	BTS-1 Meg.	Br.-Blk.-Grn. 2nd IF Grid
98	82Ω	½	RC20AE820K		Gray-Red-Blk. Series "S" Meter
99	150Ω	½	RC20AE151K		Br.-Grn.-Br. 2nd IF Cathode
100	680Ω	½	RC20AE681K	BTS-680	Blue-Gray-Br. 2nd IF Cathode
101	33KΩ	1	RC30AE333K	BTA-33K	Or.-Or.-Or. 2nd IF Screen
102	3300Ω	½	RC20AE332K	BTS-3300	Or.-Or.-Red 2nd IF Plate Decoup.
103	1000Ω	½	RC20AE102K	BTS-1000	Br.-Blk.-Red 2nd IF Cathode
104	220KΩ	½	RC20AE224K	BTS-220K	Red-Red-Yl. 3rd IF Grid
105	1 Meg.	½	RC20AE105K	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
106	150Ω	½	RC20AE151K		Br.-Grn.-Br. Par. Suppressor
107	100KΩ	1	RC30AE104K	BTA-100K	Br.-Blk.-Yl. 3rd IF Decoupling
108	100KΩ	½	RC20AE104K	BTS-100K	Br.-Blk.-Yl. De-emphasis
109	100KΩ	½	RC20AE104K	BTS-100K	Br.-Blk.-Yl. Ratio Det. Diode Load
110	100KΩ	½	RC20AE104K	BTS-100K	Br.-Blk.-Yl. " " " "
111	100KΩ	½	RC20AE104K	BTS-100K	Br.-Blk.-Yl. AM Diode Filter

DATE 9/49-#4815-13 SET #45-FOLDER #13

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	HALLICRAFTER PART No.	MEISSNER PART No.	
149	Osc. Coil 4	.1Ω	0Ω	51B936		
150	" " 5	0Ω	0Ω	51B935		
151	" " 6	0Ω	0Ω	51B941		
152A	1st IF AM	2.5Ω	6.8Ω‡	50C212		‡Includes both secondaries.
B	" " FM	1.2Ω				
153A	2nd IF AM	1Ω*	7.8Ω	50C213		*Includes both primaries.
B	" " FM		.1Ω			
154A	3rd IF AM	9.6Ω*	6Ω	50C214		
B	" " FM		.7Ω			
155	FM Det. Trans.	2Ω	1.2Ω	50C208		
156	AM BFO Coil		14Ω	54B033-1		
157	Ind. Osc. "		0Ω	51B984		
158	RF Choke		3.2Ω	53A108		
159	" "		.2Ω	53B009		
160	" "		9.5Ω	53A107		

DIAL LIGHT

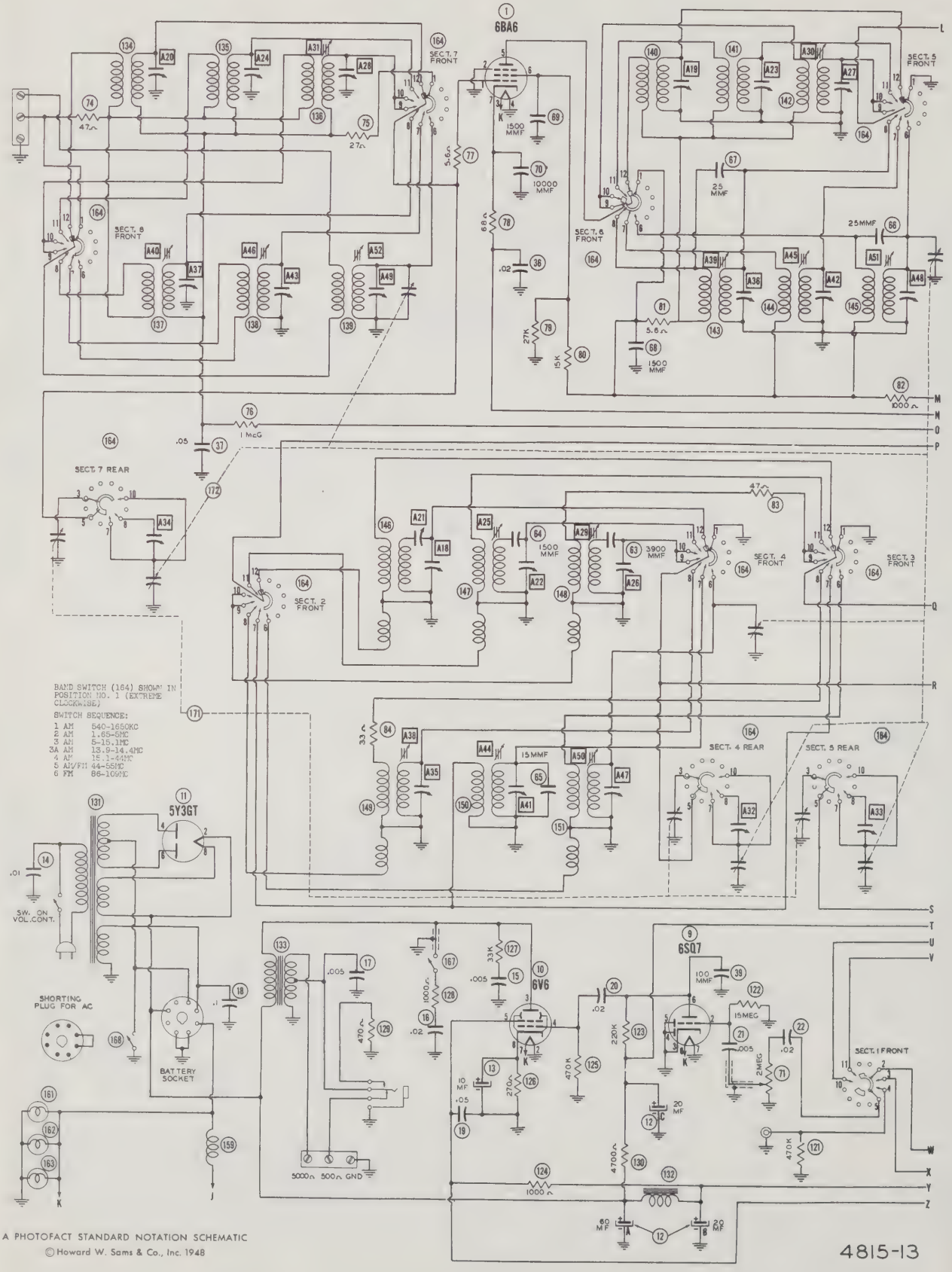
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					HALLICRAFT. PART No.		
161	Bayonet	6-8	0.15	Brown	39A004		Type 47
162-163	"	"	0.25	Blue			Type 44

MISCELLANEOUS

ITEM No.	PART NAME	HALLICRAFTERS PART No.	NOTES
164	Switch	60C261	Band
165	"	60B263	Selectivity
166	"	60B262	Reception
167	"	60A133	Tone
168	"	60A138	Standby-Receive
169	"	60A138	Noise Limiter
170	Crystal	19A123	455KC
171	3 Gang Var. Cap	48C174	(15-475MMFD) Each section (AM)
172	" " "	48C173	(Bandspread-FM)
173	Phasing Control Capacitor	48A182	
	Trimmer	44A047	A15
	Trimmer Strip Assby.	44B197	A18, A21, A22, A26, A35
	"	44B199	A19, A23, A27, A36
	"	44P199	A20, A24, A28, A37
	Trimmer	44A047	A32, A33, A34, A48, A49
	"	44A200	A41, A42, A43
	"	44A115	A47
	Meter	32B125	Carrier Level

REPLACING LAMPS

The two dial lamps and meter lamp are accessible through the hinged cabinet cover. Remove two screws holding the metal light shield to expose the dial lamps. Replace these with 6-8V. 250MA. GE. #44 (Blue bead) or equivalent. The carrier level meter lamp is made accessible by removing the four screws holding the protective cover located directly behind the meter. Replace this lamp with a 6-8 V. 150 MA. #47 (Brown bead) or equivalent. Do not use a 250 MA. lamp in the meter housing as the excessive heat will discolor the meter scale.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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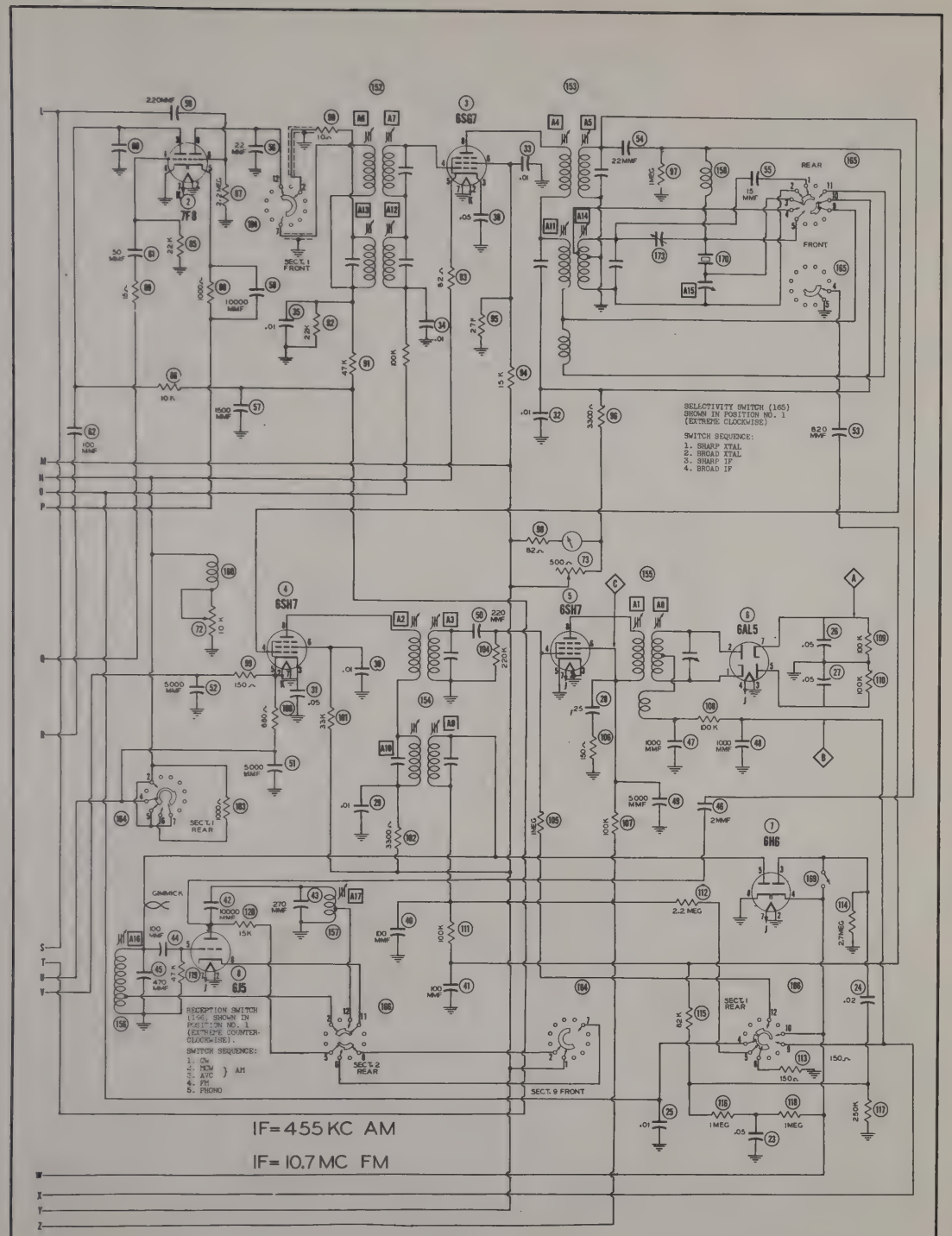

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	0V.	0V.	6.3VAC	0V.	250VDC	120VDC	8VDC	-
2	7F8	-2VDC§	0V.	180VDC	0V.	.6VDC	65VDC	6.3VAC	-.5VDC
3	6SG7	0V.	6.3VAC	1.6VDC	0V.	1.6VDC	155VDC	0V.	260VDC
4	6SH7	0V.	6.3VAC	4.6VDC	0V.	4.6VDC	225VDC	0V.	270VDC
5	6SH7‡	0V.	0V.	0V.	-.4VDC	0V.	35VDC	6.3VAC	35VDC
6	6AL5‡	0V.	0V.	0V.	6.3VAC	.4VDC	0V.	-.4VDC	-
7	6H6	0V.	0V.	0V.	0V.	-.5VDC	0V.	6.3VAC	0V.
8	6J5**	0V.	0V.	160VDC	0V.	-6.4VDC§	0V.	6.3VAC	0V.
9	6SQ7	0V.	-.4VDC	0V.	0V.	0V.	120VDC	0V.	6.3VAC
10	6V6GT	0V.	0V.	280VDC	270VDC	0V.	240VDC	6.3VAC	12.5VDC
11	5Y3GT	0V.	290VDC	0V.	265VAC	0V.	265VAC	0V.	290VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	3.6 Meg.	0Ω	.1Ω	0Ω	20KΩ	15KΩ	78Ω	-
2	7F8	22KΩ	0Ω	30KΩ	0Ω	1KΩ	20KΩ	.1Ω	2.2 Meg.
3	6SG7	0Ω	.1Ω	92Ω	2.6 Meg.	92Ω	15KΩ	0Ω	24KΩ
4	6SH7	0Ω	.1Ω	690Ω	5Ω	690Ω	50KΩ	0Ω	24KΩ
5	6SH7‡	0Ω	0Ω	0Ω	220KΩ	0Ω	120KΩ	.1Ω	120KΩ
6	6AL5‡	INF.	INF.	0Ω	.1Ω	100KΩ	0Ω	100KΩ	-
7	6H6	0Ω	0Ω	1.3 Meg.	1.3 Meg.	400KΩ	0Ω	.1Ω	0Ω
8	6J5**	0Ω	0Ω	25KΩ	0Ω	47KΩ	0Ω	.1Ω	4Ω
9	6SQ7	0Ω	15 Meg.	0Ω	0Ω	0Ω	240KΩ	0Ω	.1Ω
10	6V6GT	0Ω	0Ω	20KΩ	21KΩ	470KΩ	20KΩ	.1Ω	250Ω
11	5Y3GT	INF.	20KΩ	INF.	70Ω	INF.	65Ω	INF.	20KΩ

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.
RECEIVE-STANDBY SWITCH IN RECEIVE POSITION.
**TAKEN IN CW POSITION. NOISE LIMITER OFF.
SENSITIVITY CONTROL FULL ON.
SELECTIVITY CONTROL FULL ON.
TONE HIGH.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

STAGE GAIN MEASUREMENTS		
ANTENNA TO RF GRID	2X	600KC
RF GRID TO CONV. GRID	2X	600KC
CONVERSION GAIN	15X	IN 600KC OUT 455KC
INPUT IF TRANSFORMER	1.5X	455KC
1st IF TUBE	175X	455KC
INTER IF TRANS.	.1X	455KC
2nd IF TUBE	200X	455KC
OUTPUT IF TRANS.	.3X	455KC
AUDIO	35X	400 ∿
OUTPUT	28X	400 ∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Set all controls as follows except where noted otherwise: "Crystal-phasing" to zero, "Sensitivity" at maximum, "Reception" to "AM-MVC", "Selectivity" to "Normal-Sharp", "Volume" at maximum"CW Pitch" to zero, Tone switch to "High", Standby-Receive switch to "Receive" and Noise Limiter to "Off". Set bandspread tuning cap. fully open at all times with exception of Bands 5 & 6 where it only is used for tuning.
Use insulated alignment screwdriver for all adjustments.

10.7 MC IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	Direct	High side to rear stator of center section of bandspread tuning cap.	10.7MC (Unmodulated)	Band "5"	50 on logging scale.	DC probe to Point Ⓐ. Common to ground.	A1,A2, A3,A4, A5,A6, A7	Turn reception switch to "FM" and adjust for maximum deflection.
2	"	"	"	"	"	DC probe to Point Ⓐ. Common to ground.	A8	Adjust for zero deflection. Continue with AM alignment in Step 5.

10.7 MC IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
1	.05 MFD.	High side to Pin 4 (grid) of 6SH7 2nd IF Tube (4). Low side to chassis.	10.7MC (Freq. Mod.)	Band "5"	50 on logging scale.	Vertical input in series with .05 MFD. cap. to Point Ⓐ. Low side to chassis.	A2,A3	Turn reception switch to FM and adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
2	.05 MFD.	High side to Pin 4 (grid) of 6SG7. Low side to chassis.	"	"	"	"	A4,A5	"
3	.05 MFD.	High side to rear stator of center section of bandspread tuning cap.	"	"	"	"	A6,A7	"
4	.05 MFD.	High side to Pin 4 (grid) of 6SH7 2nd IF Tube (4). Low side to chassis.	"	"	"	Vertical input to Point Ⓐ. Ground to chassis.	A1,A8	Alternately adjust A1 for maximum amplitude and A8 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with AM Alignment in Step 5.

AM IF ALIGNMENT

In Steps 5, 6, 7 and 8 set sig. gen. to exact crystal frequency as follows: Set sig. gen. to approximately 455KC. Turn BFO on and set CW pitch for approximately a 1000 ∿ note. Set selectivity control to "Crystal-Sharp" and tune sig. gen. to weakest of the two response frequencies on either side of zero beat. Adjust "Crystal-Phasing" control for minimum audio output. Retune sig. gen. for maximum output on the opposite side of zero beat.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
5	Direct	High side to rear stator of center section of tuning cap. Low side to chassis.	455KC (See prealignment notes)	Band "4"	50 on logging scale.	Across voice coil	A9,A10, A11,A12 A13	Turn selectivity switch to normal sharp and adjust A9, A10, A11, A12 and A13 for maximum output.
6	Direct	"	"	"	"	"	A14	Turn selectivity switch to "Crystal-Broad". Adjust A14 for maximum output.
7	Direct	"	"	"	"	"	A15	Turn selectivity switch to "Normal-Sharp". Adjust A15 for maximum output.
8	Direct	"	"	"	"	"	A16	Turn reception switch to "CW". Remove CW pitch control knob and adjust A16 for zero beat. Replace knob with zero at index line. Repeat 10.7 MC IF alignment to insure that they have not been detuned in the process of aligning 455KC IF
9	Direct	"	10.7MC	Band "5"	"	"	A17	Adjust for maximum output Tune sig. gen. to 11.61MC If signal is not heard retune sig. gen. to 10.7 MC and adjust A17 counterclockwise to next peak. Adjust for maximum output and recheck for image. Reassembly receiver in cabinet.

RF ALIGNMENT

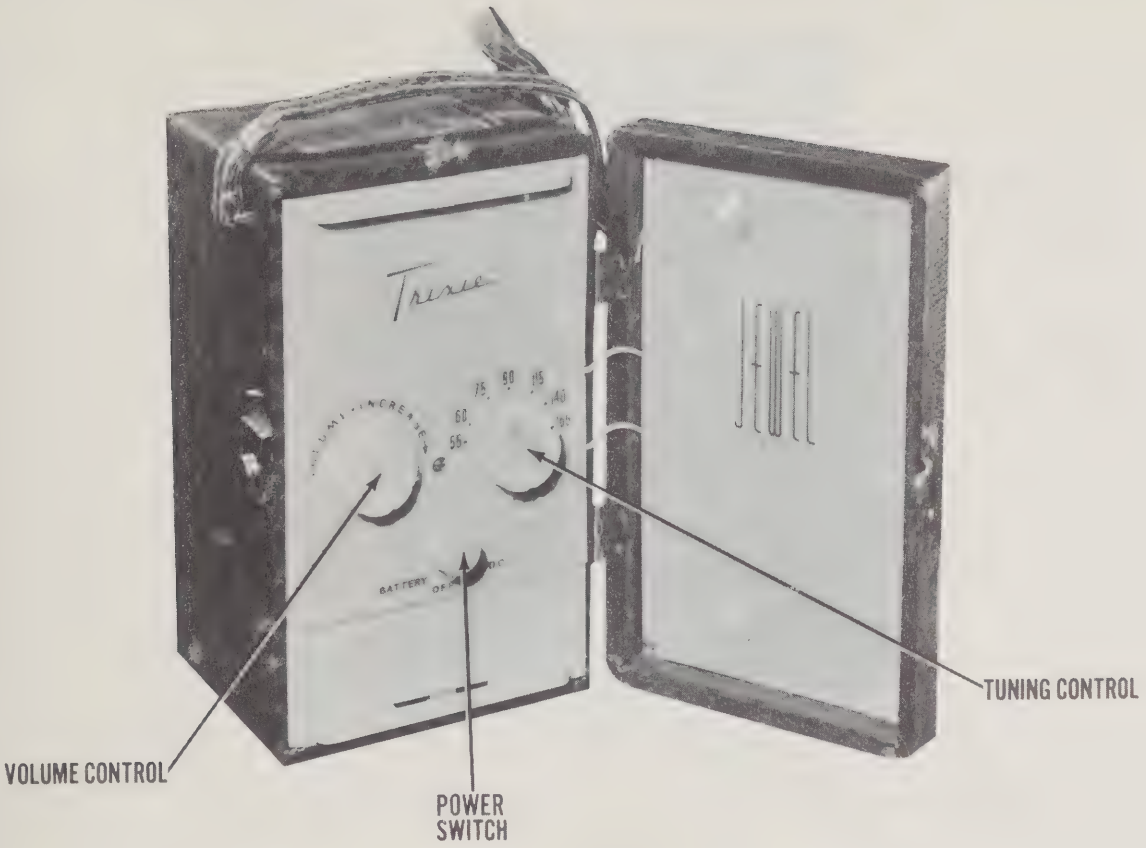
RMA Dummy consists of 200 MMFD cap. in series with 20 microhenry choke with choke shunted by a 400 MMFD cap. in series with a 400Ω carbon resistor.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
10	RMA Dummy (see prealignment notes)	High side to ant. terminal "A1". Low side to "A2" with "A2" grounded.	1500KC	Band 1	1500KC	Across voice coil	A18, A19, A20	Adjust for maximum output in order given.
11	"	"	600KC	"	600KC	"	A21	Adjust for maximum output in order given. Repeat Steps 10 & 11 until no further improvement can be made.
12	"	"	4.5MC	Band 2	4.5MC	"	A22, A23, A24	Adjust for maximum output in order given.
13	"	"	2MC	"	2MC	"	A25	Adjust for maximum output in order given. Repeat Steps 12 & 13 until no further improvement can be made.
14	330Ω carbon res.	"	14MC	Band 3	14MC	"	A26	Adjust for maximum output.
15	"	"	"	"	Tune for maximum output.	"	A27, A28	Rock tuning cap. and adjust for maximum output.
16	"	"	6MC	"	6MC	"	A29	Adjust for maximum output.
17	"	"	"	"	Tune for maximum output.	"	A30, A31	Rock tuning cap. and adjust for maximum output. Repeat Steps 14 thru 17 until no further improvement can be made.
18	"	"	14MC	Band 3A	Main tuning dial at 20 meter band marker. Bandspread at 14MC.	"	A32	Adjust for maximum output.
19	"	"	14.2MC	"	Main tuning dial at 20 meter band marker. Bandspread tuned maximum output.	"	A33, A34	Rock tuning cap. and adjust for maximum output.
20	"	"	36MC	Band 4	36MC	"	A35	Adjust for maximum output. Tune sig. gen. to 35.1MC. If signal is not heard, retune sig. gen. to 36MC and close A35 to next peak. Adjust for maximum output and recheck for image.
21	"	"	"	"	Tune for maximum output.	"	A36, A37	Rock tuning cap. and adjust for maximum output.
22	"	"	18MC	"	18MC	"	A38	Adjust for maximum output.
23	"	"	"	"	Tune for maximum output.	"	A39, A40	Rock tuning cap. and adjust for maximum output. Repeat Steps 20 thru 23 until no further improvement can be made.
24	"	"	54MC	Band 5	54MC (On bandspread dial)	"	A41	Adjust for maximum output.
25	"	"	"	"	Tune for maximum output.	"	A42, A43	Rock tuning cap. and adjust for maximum output.
26	"	"	46MC	"	46MC	"	A44	Adjust for maximum output.
27	"	"	"	"	Tune for maximum output.	"	A45, A46	Rock tuning cap. and adjust for maximum output. Repeat Steps 24 thru 27 until no further improvement can be made.
28	"	"		"	44.6MC (See remarks)	"	A17	Tune for fourth harmonic of the second oscillator at approx. 44.6MC If signal is not heard A17 is adjusted to the image frequency and Step 9 must be repeated.
						CONNECT VTVM		
29	330Ω carbon res.	High side to ant. terminal "A1". Low side to "A2" with "A2" grounded	106MC	Band 6	106MC	DC probe to Point Ⓐ. Common to chassis	A47	Adjust for maximum deflection.
30	"	"	"	"	Tune for maximum deflection.	"	A48, A49	Rock tuning cap. and adjust for maximum deflection.
31	"	"	89MC	"	89MC	"	A50	Adjust for maximum deflection.
32	"	"	"	"	Tune for maximum deflection.	"	A51, A52	Rock tuning cap. and adjust for maximum deflection. Repeat Steps 29 thru 32 until no further improvement can be made.

FIG. 1

FIG. 2

JEWEL MODEL 801 (TRIXIE)
BATTERY-LINE OPERATED



JEWEL MODEL 801 (TRIXIE)
BATTERY-LINE OPERATED

JEWEL MODEL 801

TRADE NAME	Jewel, Model 801 (Trixie)
MANUFACTURER	Jewel Radio Corp., 583 Sixth Ave., New York,11, N.Y.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1S5 Det.-AVC-AF, 3S4 Power Output
POWER SUPPLY	110-120 Volts AC-DC or 1.5 Volt "A" Supply and 67.5 Volt "B" Supply
RATING	.14 Amp. @ 117 Volts AC and 220MA @ 1.5 Volts DC and 7.8MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to large stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200 MMF. to reduce hum modulation.
2	.1 MFD.	"	1650KC	"	"	A5	Adjust for maximum output. Reassemble receiver in cabinet.
3		Loop	1400KC	Tune for maximum volume.		A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust A6 for maximum volume.

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DATE 9/48-#4815-14 SET #45-FOLDER #14

PARTS LIST AND DESCRIPTIONS

JEWEL MODEL 801 (TRIXIE)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		JEWEL PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3V4	3V4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	JEWEL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5A	40	150		PRSA150/40-40	EDL4415	TDSB-2x40-150	TA-440	Filter-Red Lead
B	40	150		PRS15/250	BRH1525	TM-250-15	UHC-215	" -Green Lead
C	200	15						" -Yellow Lead
6	.05	400		484-.05	DT4S5	ST-4-05	TC-15	Line Filter
7	.006	400		484-.006	DT4D6	ST-6-006	TC-26	Output Plate Bypass
8	.006	400		484-.006	DT4D6	ST-6-006	TC-26	Audio Coupling
9	.03	150		484-.03	DT4S3	ST-6-03	TC-13	AF Screen Bypass
10	.006	400		484-.006	DT4D6	ST-6-006	TC-26	Audio Coupling
11	.02	200		484-.02	DT2S2	ST-4-02	TC-12	Screen Bypass
12	.25	200			DT2P25	ST-2-25	TC-2	Filament Bypass
13	.01	200		484-.01	DT2S1	ST-4-01	TC-11	IF Grid Filter
14	.02	200		484-.02	DT2S2	ST-4-02	TC-12	AVC Filter
15	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
16	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter

CONTROLS

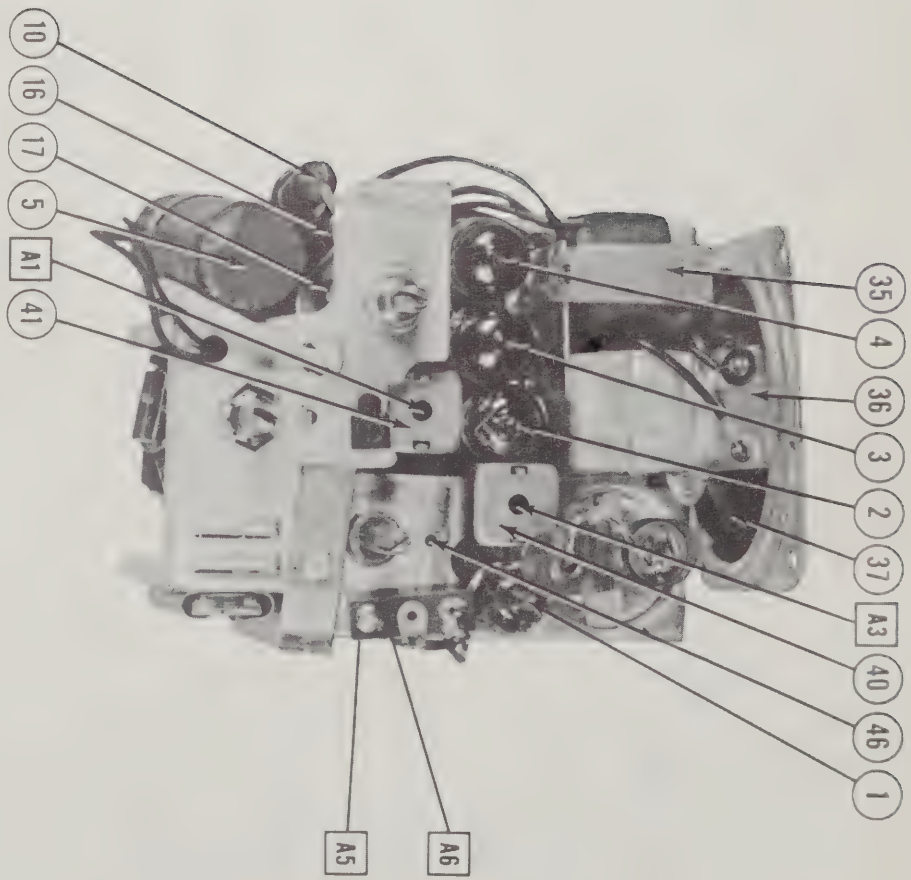
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	JEWEL PART No.	IRC PART No.	CLAROSTAT PART No.	
17A	1 Meg.	½	50-10	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KS8-3	Attach to 17A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	JEWEL PART No.	IRC PART No.	
18	100K	½		BTS-100K	Br.-Blk.-Yl. Osc. Grid
19	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. IF Grid
20	10K	½		BTS-10K	Br.-Blk.-Or. IF Screen
21	3 Meg.	½		BTS-3.3 Meg.	Or.-Blk.-Grn. AVC Network
22	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
23	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen
24	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
25	3 Meg.	½		BTS-3.3 Meg.	Or.-Blk.-Grn. Output Grid
26	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. Bias
27	470Ω	½		BTS-470	Yl.-Vi.-Br. "
28	3300Ω	½		BTS-3300	Or.-Or.-Red Fil. String
29	1000Ω	½		BTS-1000	Br.-Blk.-Red " "
30	270Ω	2 (DW)		BW-2-270	Red-Vi.-Br. Fil. Dropping-See Note
31A	115Ω	10	20-51	AB-1000	" "
B	100Ω	10		AB-1000	Filter
32	81Ω	1		BW-1-80	Grn.-Br.-Blk. Rect. Ballast
33	3300Ω	½		BTS-3300	Or.-Or.-Red Fil. String
34	82Ω	½		BW-½-56	Grn.-Blue-Blk. Fil. String

Note-Some models delete this part and change Items 31A and 31B to Part No. 20-69.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		JEWEL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
35	4100Ω	3.4Ω	350Ω	.7Ω	Part of 80-6			A-2998‡	‡Bend mounting tabs down, file out slots and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			JEWEL PART No.	JENSEN PART No.	QUAM PART No.	
36	FIELD PM	VC IMP. 3.4Ω	80-6		3A07#	#Drill and tap magnet frame.
37	CONE DIA. 3-3/8"	VC DIA. 9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	JEWEL PART No.	MEISSNER PART No.	
38	Loop Ant.		3.2Ω			
39	Osc. Coil	2.3Ω	7.8Ω			
40	Input IF	26.2Ω	26.2Ω		16-6668	
41	Output IF	26.2Ω	26.2Ω		16-6669	

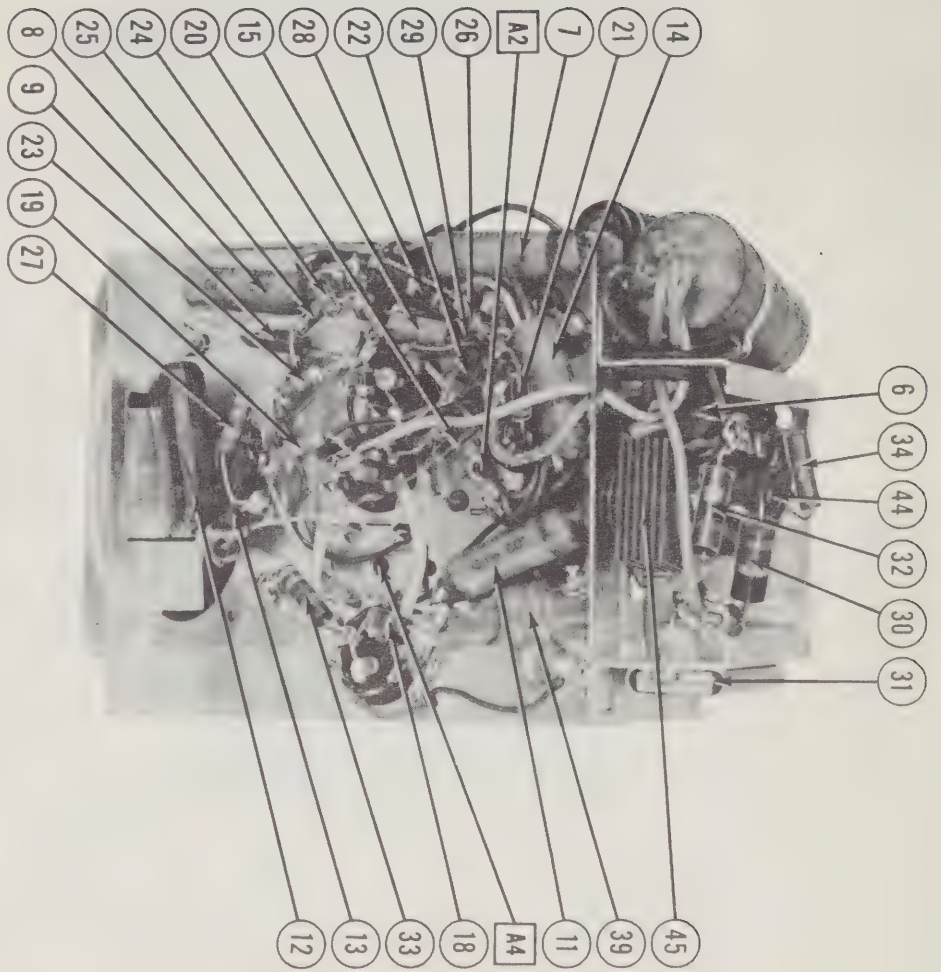
BATTERIES

ITEM No.	VOLTAGE	JEWEL PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
42	1.5V "A"		#950			2R			
43	67.5V "B"			#467			XX45		

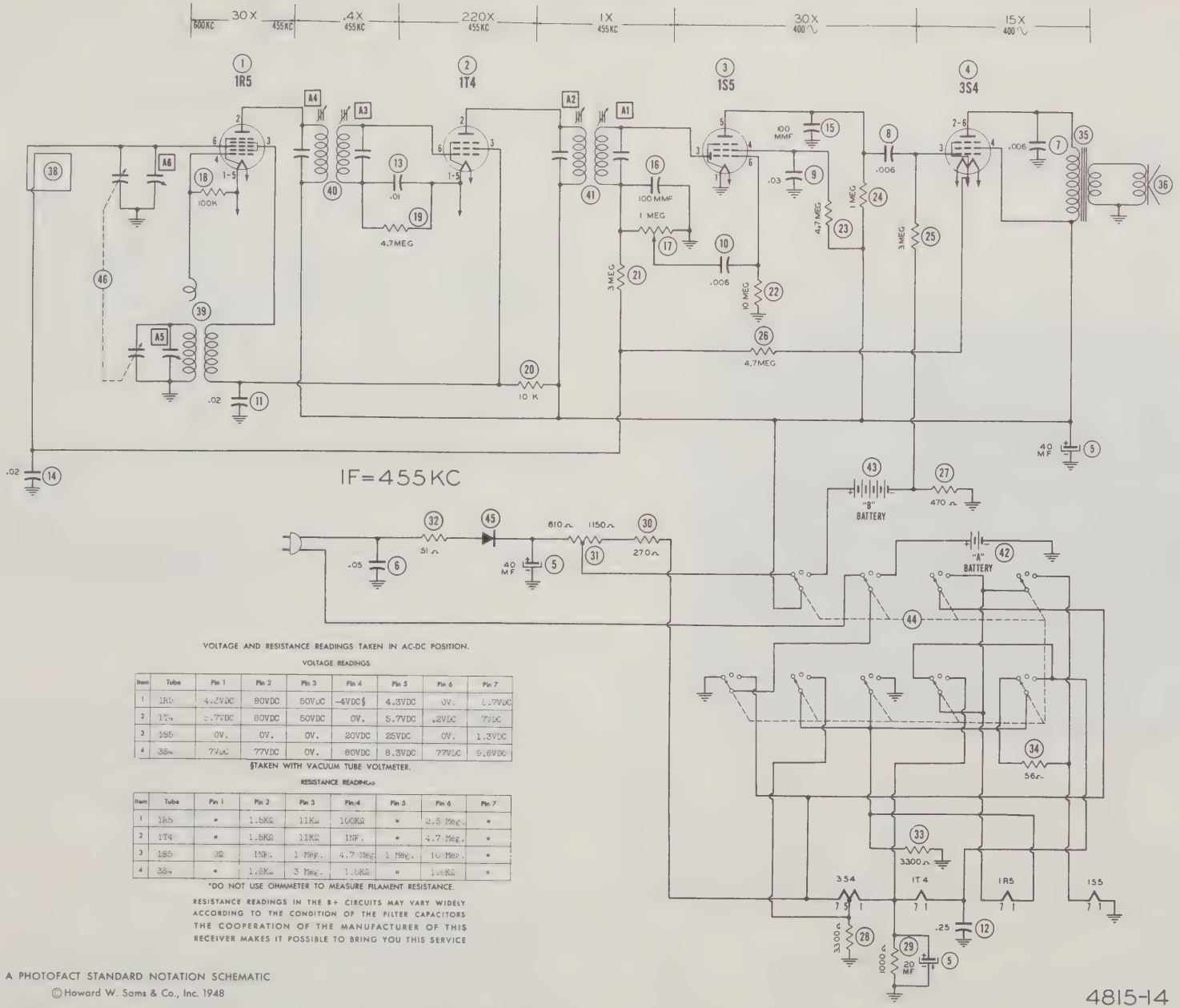
MISCELLANEOUS

ITEM No.	PART NAME	JEWEL PART No.	NOTES
44	Switch		AC/DC Batt.
45	Rectifier		Selenium
46	2 Gang Var. Cap.		(20-375MMF, 25-155MMF)

CHASSIS—BOTTOM VIEW



JEWEL MODEL 801 (TRIXIE)



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	4.2VDC	80VDC	50VDC	-4VDC§	4.3VDC	0V.	5.7VDC
2	1T4	5.7VDC	80VDC	50VDC	0V.	5.7VDC	.2VDC	7VDC
3	1S5	0V.	0V.	0V.	20VDC	25VDC	0V.	1.3VDC
4	3S4	7VDC	77VDC	0V.	80VDC	8.3VDC	77VDC	9.6VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	1.5KΩ	11KΩ	100KΩ	*	2.5 Meg.	*
2	1T4	*	1.5KΩ	11KΩ	1MΩ.	*	4.7 Meg.	*
3	1S5	3Ω	1MΩ.	1 MΩ.	4.7 Meg.	1 Meg.	10 Meg.	*
4	3S4	*	1.8KΩ	3 Meg.	1.8KΩ	*	1.8KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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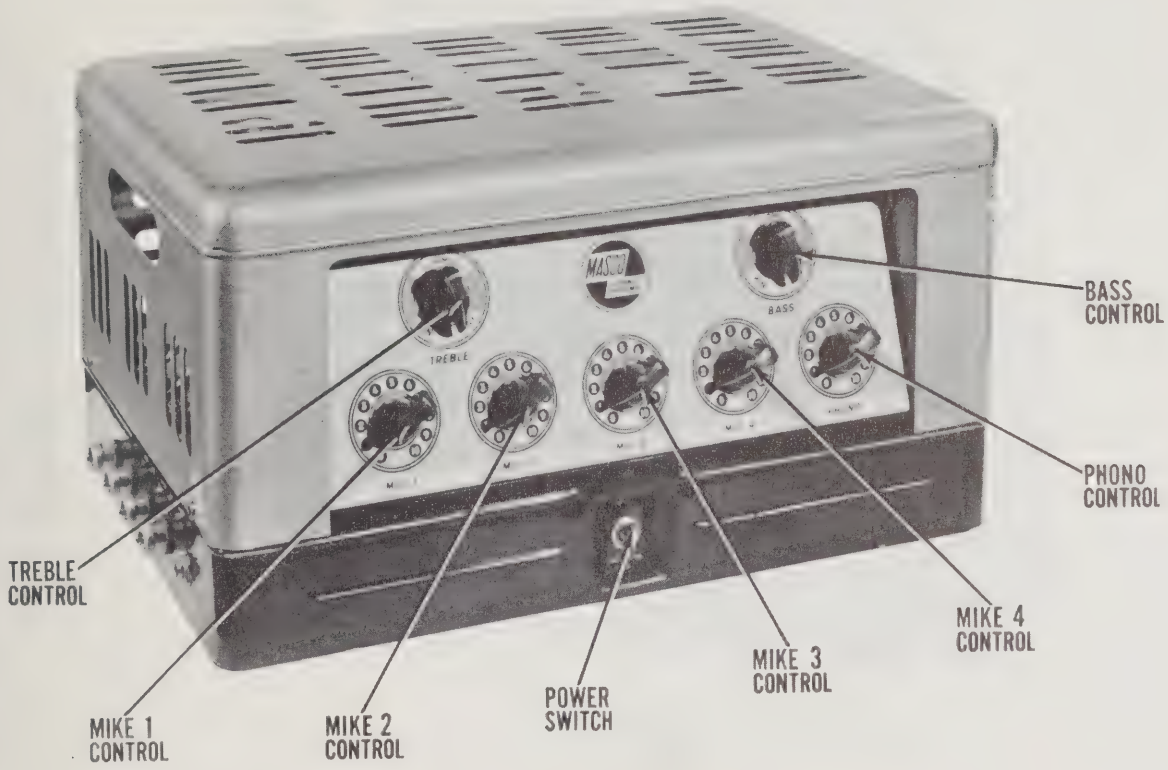
4815-14

The stage gain measured values listed above are approximate values for an average operative stage rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

MASCO MODEL
M A 50 N



MASCO MODEL
M A 50 N

MASCO MODEL MA-50N

TRADE NAME	Masco, Model MA-50N
MANUFACTURER	Mark Simpson Mfg. Co., Inc., 32-28 49th St., Long Island City, N.Y.
TYPE SET	AC Operated 4 Channel Audio Amplifier
TUBES (THIRTEEN)	Types, 6J7 Mic. 1 Amp., 6J7 Mic. 2 Amp., 6J7 Mic. 3 Amp., 6J7 Mic. 4 Amp., 6SC7 Mixer-AF Amp., 6SJ7 AF Amp., 6SC7 AF-Phase Inv., (4) 6L6G Power Output, (2) 5V4G Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	1.73 Amp. @ 117 Volts AC

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DATE 9/48- 4815-15 SET '45-FOLDER 15

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MASCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Mic. 1 Amp.	6J7	6J7	7R	
2	Mic. 2 Amp.	6J7	6J7	7R	
3	Mic. 3 Amp.	6J7	6J7	7R	
4	Mic. 4 Amp.	6J7	6J7	7R	
5	Mixer-AF Amp.	6SC7	6SC7	8S	
6	AF Amp.	6SJ7	6SJ7	8U	
7	AF-Phase Inv.	6SC7	6SC7	8S	
8	Power Output	6L6G	6L6G	7AC	
9	" "	6L6G	6L6G	7AC	
10	" "	6L6G	6L6G	7AC	
11	" "	6L6G	6L6G	7AC	
12	Rectifier	5V4G	5V4G	5L	
13	"	5V4G	5V4G	5L	

CAPACITORS

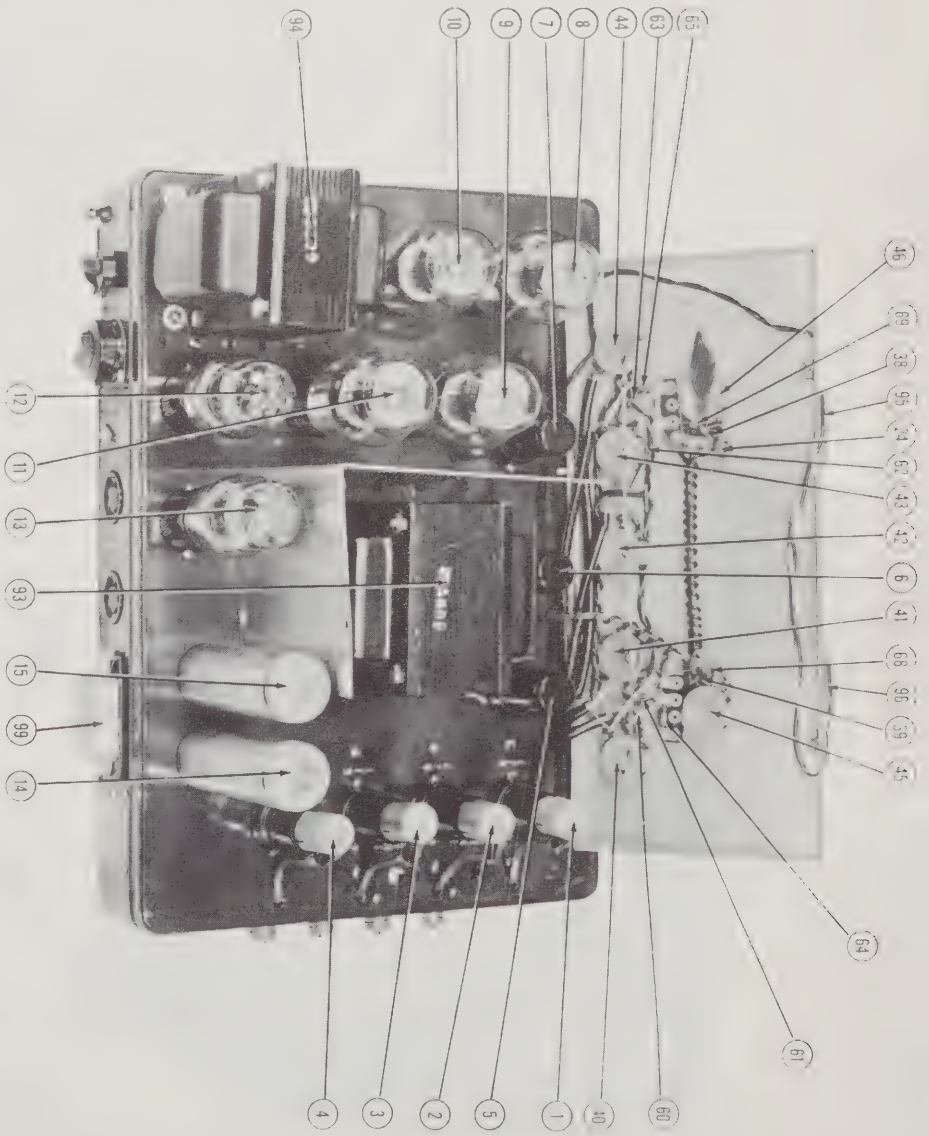
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MASCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
14	8	600		GL-600/8	KR608	D-8-600	AP-86	Filter
15	8	600		GL-600/8	KR608	D-8-600	AP-86	"
16	8	450		PRS450/8	BR845	M-8-450	UT-8	"
17A	8	450		PRSA450/8-8	EDL8845	M-2x8-450	UT-88	Decoupling
B	8	450						2nd AF Plate Decoupling
18	8	450		PRS450/8	BR845	M-8-450	UT-8	Decoupling
19	50	50		PRS50/50	BR505	M-50-50	TA-550	Cathode Bypass
20	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Audio Coupling
21	.1	600		684-.1	DT6P1	ST-6-1	TC-1	" "
22	.05	600		684-.05	DT6S5	ST-6-05	TC-15	" "
23	.05	600		684-.05	DT6S5	ST-6-05	TC-15	" "
24	.005	600		684-.005	DT6D5	ST-6-005	TC-25	Tone Compensation
25	.01	600		684-.01	DT6S1	ST-6-01	TC-11	Audio Coupling
26	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Mic. 1 Amp. Screen Byp.
27	.005	600		684-.005	DT6D5	ST-6-005	TC-25	Audio Coupling
28	.01	600		684-.01	DT6S1	ST-6-01	TC-11	" "
29	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Mic. 2 Amp. Screen Byp.
30	.005	600		684-.005	DT6D5	ST-6-005	TC-25	Audio Coupling
31	.01	600		684-.01	DT6S1	ST-6-01	TC-11	" "
32	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Mic. 3 Amp. Screen Byp.
33	.005	600		684-.005	DT6D5	ST-6-005	TC-25	Audio Coupling
34	.01	600		684-.01	DT6S1	ST-6-01	TC-11	" "
35	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Mic. 4 Amp. Screen Byp.
36	.005	600		684-.005	DT6D5	ST-6-005	TC-25	Audio Coupling
37	500	500		1468-.0005	5W5T5	M0.5-35	1FM-35	3rd AF Grid Bypass
38	500	500		1468-.0005	5W5T5	M0.5-35	1FM-35	Tone Compensation
39	500	500		1468-.0005	5W5T5	M0.5-35	1FM-35	" "

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MASCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
40A	500KΩ	½		D13-133	M-60-Z	Mike 1 Control
B	Shaft			A	Not Req.	Attach to 40A per instructions
41A	500KΩ	½		D13-133	M-60-Z	Mike 2 Control
B	Shaft			A	Not Req.	Attach to 41A per instructions
42A	500KΩ	½		D13-133	M-60-Z	Mike 3 Control
B	Shaft			A	Not Req.	Attach to 42A per instructions
43A	500KΩ	½		D13-133	M-60-Z	Mike 4 Control
B	Shaft			A	Not Req.	Attach to 43A per instructions
44A	500KΩ	½		D13-133	M-60-Z	Phase Control
B	Shaft			A	Not Req.	Attach to 44A per instructions
45A	500KΩ	½		D13-133	M-60-Z	Treble Control
B	Shaft			A	Not Req.	Attach to 45A per instructions
46A	500KΩ	½		D13-133	M-60-Z	Bass Control
B	Shaft			A	Not Req.	Attach to 46A per instructions
47	50Ω	1		W-50	43-50	Hum Bal. Control

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	
48	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue Mic. 1 Amp. Grid
49	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Mic. 1 Amp. Screen
50	270KΩ	½		BTS-270K	Red-Vi.-Yl. Mic. 1 Amp. Plate Load
51	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue Mic. 2 Amp. Grid
52	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Mic. 2 Amp. Screen
53	270KΩ	½		BTS-270K	Red-Vi.-Yl. Mic. 2 Amp. Plate Load
54	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue Mic. 3 Amp. Grid
55	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Mic. 3 Amp. Screen
56	270KΩ	½		BTS-270K	Red-Vi.-Yl. Mic. 3 Amp. Plate Load
57	15 Meg.	½		BTS-15 Meg	Br.-Grn.-Blue Mic. 4 Amp. Grid
58	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Mic. 4 Amp. Screen
59	270KΩ	½		BTS-270K	Red-Vi.-Yl. Mic. 4 Amp. Plate Load
60	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Isolation
61	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. "
62	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. "
63	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. "
64	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. "
65	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. "
66	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Mixer Plate Load
67	1000Ω	½		BTS-1000	Br.-Blk.-Red Mixer Cathode
68	270KΩ	½		BTS-270K	Red-Vi.-Yl. Tone Comp.
69	27KΩ	½		BTS-27K	Red-Vi.-Or. Tone Comp.
70	2200Ω	½		BTS-2200	Red-Red-Red 2nd AF Cathode
71	47KΩ	½		BTS-47K	Yl.-Vi.-Or. 2nd AF Plate Load
72	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 2nd AF Plate Decoup.
73	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Voltage Dropping
74	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 3rd AF Grid
75	1000Ω	½		BTS-1000	Br.-Blk.-Red 3rd AF Cathode
76	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 3rd AF Plate Load
77	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Ph. Inv. Plate Load
78	3300Ω	½		BTS-3300	Or.-Or.-Red Ph. Inv. Grid
79	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Output Grid
80	100KΩ	½		BTS-100K	Br.-Blk.-Yl. " "
81	250Ω	½		BW-½-270	Red-Grn.-Br. Parasitic Suppressor
82	250Ω	½		BW-½-270	Red-Grn.-Br. " "
83	250Ω	½		BW-½-270	Red-Grn.-Br. " "
84	250Ω	½		BW-½-270	Red-Grn.-Br. " "
85	18Ω	½		BW-½-18	Br.-Gray-Blk. " "
86	18Ω	½		BW-½-18	Br.-Gray-Blk. " "
87	18Ω	½		BW-½-18	Br.-Gray-Blk. " "
88	18Ω	½		BW-½-18	Br.-Gray-Blk. " "
89	100Ω	20		DG-100	Output Cathode
90	10KΩ	½		BTS-10K	Br.-Blk.-Or. Voltage Dropping
91	2500Ω	10		AB-2500	Filter
92	270KΩ	½		BTS-270K	Red-Vi.-Yl. Feedback

TRANSFORMER (POWER)

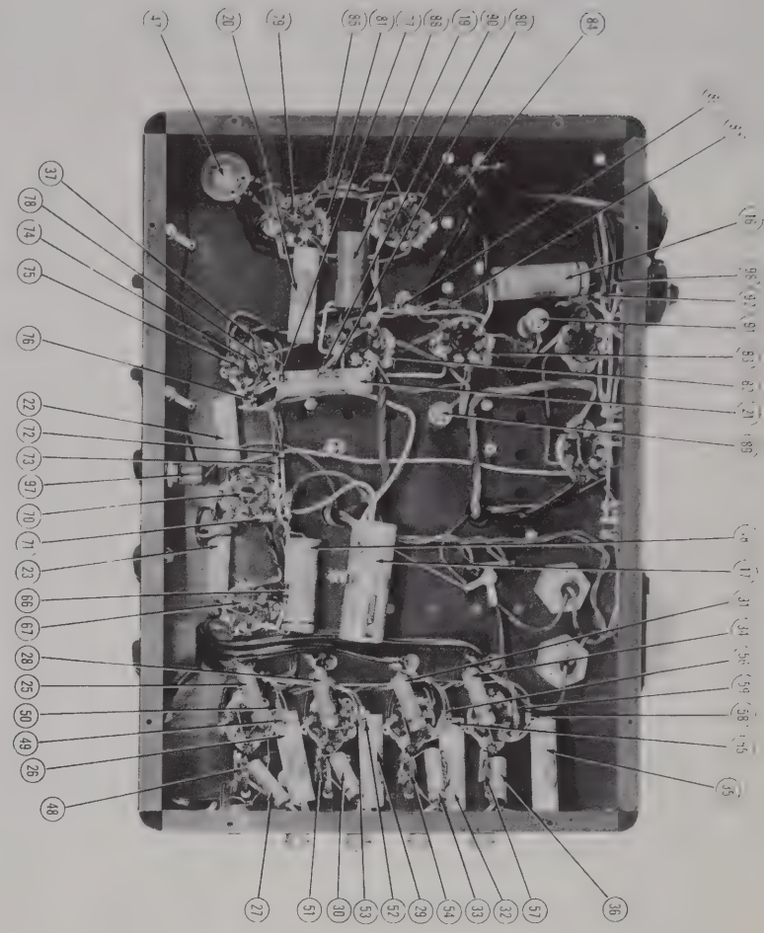
ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	MASCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
93	117V AC @ 1.73A	650V CT .235A DC	5.35V AC @ 4.0A	6.4VAC @ 5.9A	P-50	P-6315#		P-3156

#Drill new mounting holes, mount vertically with universal mounting brackets and add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MASCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
94	3500Ω CT	4Ω 8Ω 15Ω 125Ω 250Ω 500Ω	100Ω CT	.4Ω .5Ω .6Ω 13Ω 18.5Ω 26.5Ω	T-50	A-3502#	T22878	A-3129	#Drill new mounting holes.

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MASCO PART No.		
95	Bayonet	6-8	0.25	Blue			Type 44
96	"	6-8	0.25	"			Type 44

MISCELLANEOUS

ITEM No.	PART NAME	MASCO PART No.	NOTES
97	Switch		Power
98	"		Output Selector
99	Fuse		3 Amp.

SPEAKERS

1. This amplifier is designed for use with PM speakers or PM re-entrant horns only. If electro-dynamic speakers are to be used a separate exciter supply must be employed.

2. Determine the number of speakers required. Make sure that the sum of the power ratings of the speakers selected is approximately equal to the rated output of the amplifier, namely 50 watts. For example: If the speakers are rated at 10 watts each, 5 speakers are required for a 50 watt amplifier.

2. Connect the speakers or speaker lines to the output sockets through the use of one or two six-prong plugs. Pins #2 & #5 of the plugs should be used for the connections. Note that both output sockets are internally connected in parallel.

   For running voice coil cables use wire #18 or heavier, twisted or parallel. For cable lengths exceeding 75 feet use the "line" impedance taps and employ "line" matching transformers on the speakers.

3. Select the proper output impedance by rotating the impedance selector until the desired impedance tap is visible through the small opening in the selector.

   DO NOT ROTATE THE SELECTOR WHILE THE AMPLIFIER IS OPERATING.

   The proper impedance tap to be used is determined by the impedance of the speakers or lines, the number of speakers or lines and method of connection. The tap setting for speakers (or lines) of the same impedance connected in parallel is equal to the impedance of one speaker or line divided by the total number of such speakers (or lines). Thus four 15 ohm trumpet speakers in parallel should be connected to 15/4 = 3-3/4 ohms (use 4 ohm setting). Similarly two 500 ohm lines in parallel are connected to 250 ohms. In series operation of equal impedances the net impedance is equal to the impedance of one speaker or line times the total number. Thus four 4 ohm speakers in series equal 16 ohms (use 15 ohm tap).

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6J7	0V.	21VDC*	23VDC	22VDC	0V.	0V.	21VDC*	0V.	-.8VDC
2	6J7	0V.	21VDC*	23VDC	22VDC	0V.	0V.	21VDC*	0V.	-.8VDC
3	6J7	0V.	21VDC*	23VDC	22VDC	0V.	0V.	21VDC*	0V.	-.8VDC
4	6J7	0V.	21VDC*	23VDC	22VDC	0V.	0V.	21VDC*	0V.	-.8VDC
5	6SC7	0V.	55VDC	-.2VDC	-.2VDC	55VDC	.7VDC	21VDC*	21VDC*	-
6	6SJ7	0V.	21VDC*	65VDC	0V.	2.8VDC	65VDC	21VDC*	65VDC	-
7	6SC7	0V.	160VDC	0V.	0V.	175VDC	1.8VDC	21VDC*	21VDC*	-
8	6L6G	0V.	21VDC*	370VDC	320VDC	0V.	0V.	21VDC*	21VDC	-
9	6L6G	0V.	21VDC*	370VDC	320VDC	0V.	0V.	21VDC*	21VDC	-
10	6L6G	0V.	21VDC*	370VDC	320VDC	0V.	0V.	21VDC*	21VDC	-
11	6L6G	0V.	21VDC*	370VDC	320VDC	0V.	0V.	21VDC*	21VDC	-
12	5V4G	0V.	390VDC	0V.	325VAC	390VDC	325VDC	0V.	390VDC	-
13	5V4G	0V.	390VDC	0V.	325VAC	0V.	325VDC	0V.	39VDC	-

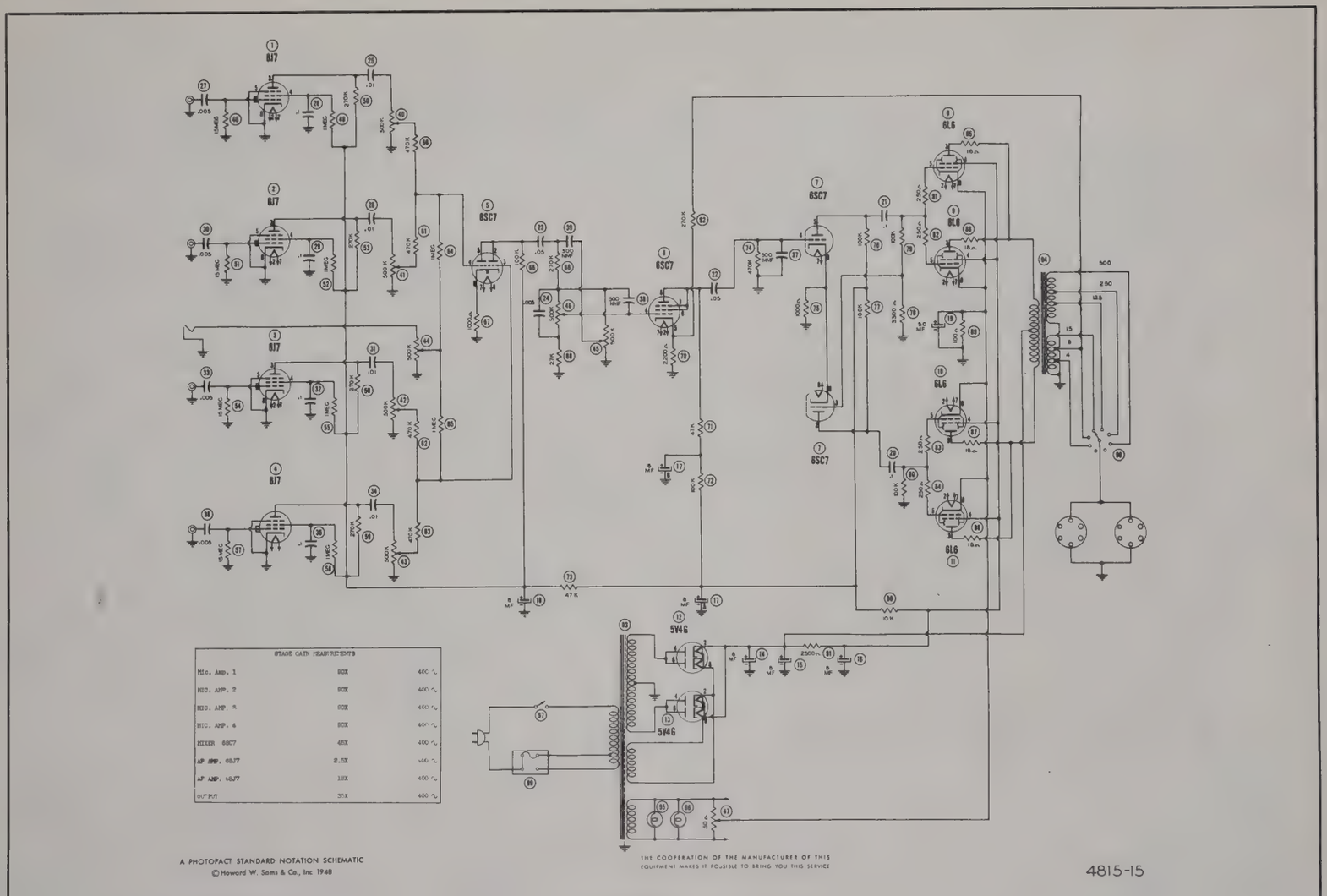
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6J7	0Ω	115Ω	410KΩ	1.1 Meg.	0Ω	INF.	115Ω	0Ω	15 Meg.
2	6J7	0Ω	115Ω	410KΩ	1.1 Meg.	0Ω	INF.	115Ω	0Ω	15 Meg.
3	6J7	0Ω	115Ω	410KΩ	1.1 Meg.	0Ω	INF.	115Ω	0Ω	15 Meg.
4	6J7	0Ω	115Ω	410KΩ	1.1 Meg.	0Ω	INF.	115Ω	0Ω	15 Meg.
5	6SC7	0Ω	240KΩ	30KΩ	30KΩ	240KΩ	1KΩ	115Ω	115Ω	-
6	6SJ7	0Ω	110Ω	140KΩ	27KΩ	2.2KΩ	140KΩ	115Ω	140KΩ	-
7	6SC7	0Ω	190KΩ	3.3KΩ	470KΩ	190KΩ	1KΩ	115Ω	115Ω	-
8	6L6G	0Ω	115Ω	80KΩ	83KΩ	100KΩ	100KΩ	115Ω	225Ω	-
9	6L6G	INF.	115Ω	80KΩ	83KΩ	100KΩ	100KΩ	115Ω	225Ω	-
10	6L6G	INF.	115Ω	80KΩ	83KΩ	100KΩ	100KΩ	115Ω	225Ω	-
11	6L6G	INF.	115Ω	80KΩ	83KΩ	100KΩ	100KΩ	115Ω	225Ω	-
12	5V4G	INF.	80KΩ	INF.	24Ω	80KΩ	22Ω	INF.	80KΩ	-
13	5V4G	INF.	80KΩ	INF.	24Ω	INF.	22Ω	INF.	80KΩ	-

*6.4 Volts measured between filament pins.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt;
AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.


6J7
6SC7
6L6
5V4G
STAGE GAIN MEASUREMENTS
Mic. Amp. 1 90X 400 ~
MIC. AMP. 2 90X 400 ~
MIC. AMP. 3 90X 400 ~
MIC. AMP. 4 90X 400 ~
MIXER 6SC7 45X 400 ~
AF AMP. 6SJ7 2.5X 400 ~
AF AMP. 6SJ7 18X 400 ~
OUTPUT 30X 400 ~

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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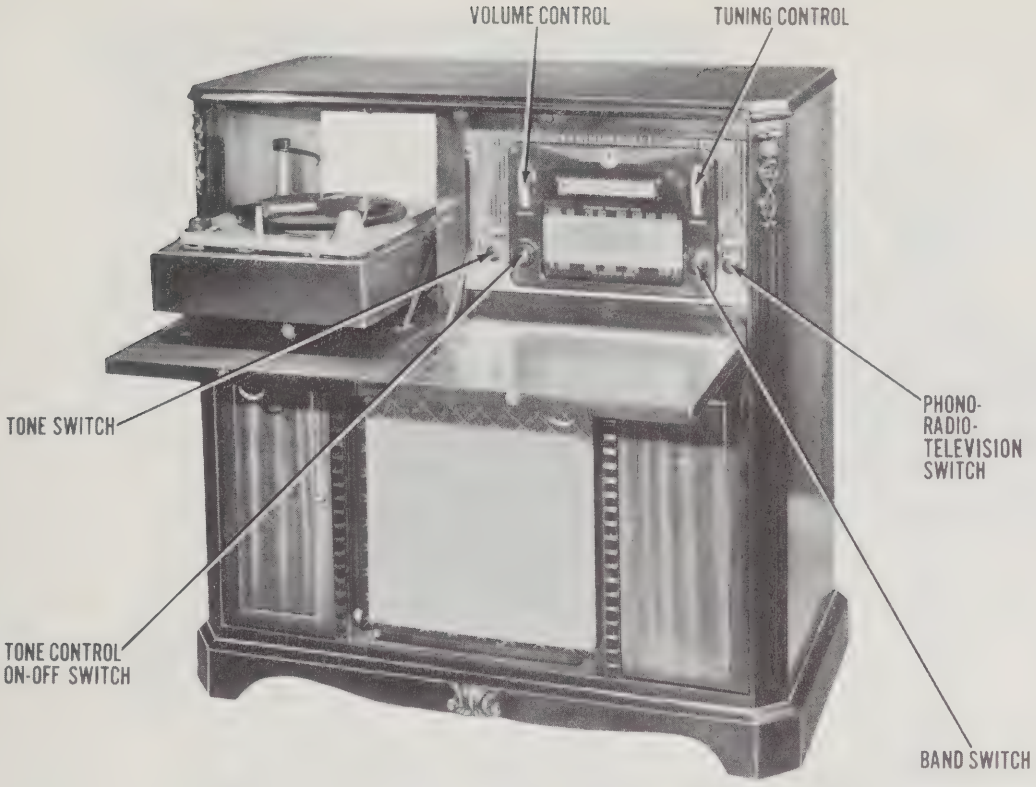
THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

4815-15

MIDWEST MODELS R-16,
RG-16, RT-16 (Ch. RGT-16)



MIDWEST MODEL RG-16

TRADE NAME	Midwest, Models R-16, RG-16, RT-16 (Ch. RGT-16)
MANUFACTURER	Midwest Radio Corp., 909 Broadway, Cincinnati, Ohio
TYPE SET	AC Operated Phono-Radio Combination, Multi-Band AM-FM Superheterodyne Receiver.
TUBES (SIXTEEN)	Types, 6BA6 FM RF Amp., 6BE6 FM Conv., 6C4 FM AFC, 7A7 AM RF Amp., 7Q7 AM Conv., 7A7 1st IF Amp., 7A7 2nd IF Amp., 6AL5 FM Detector, 7A6 AM Detector, 6U5 Tuning Eye, 7A4 1st AF, 7A4 2nd AF, 7A4 Phase Inv., (2) 7C5 Power Output, 5U4G Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.81 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1650KC SHORT WAVE 1.6-4.8MC, 4.7-10.1MC, 11-23MC FREQ. MOD. 88-108MC

PUSHBUTTON ADJUSTMENTS

1. Turn receiver on and allow it to warm up at least fifteen minutes.
2. Remove pushbutton covers by pulling straight out.
3. Loosen lock screw about one half turn.
4. Depress selected button and hold in firmly while using manual tuning control to tune in desired station.
5. Tighten set screw and release button.
6. Check adjustment by detuning with the manual tuning control and re-tuning with the button. If adjustment is off repeat Steps 3, 4, 5 and 6.
7. Replace button cover. This button is now set up.
8. To set up the remaining buttons follow the procedure outlined above.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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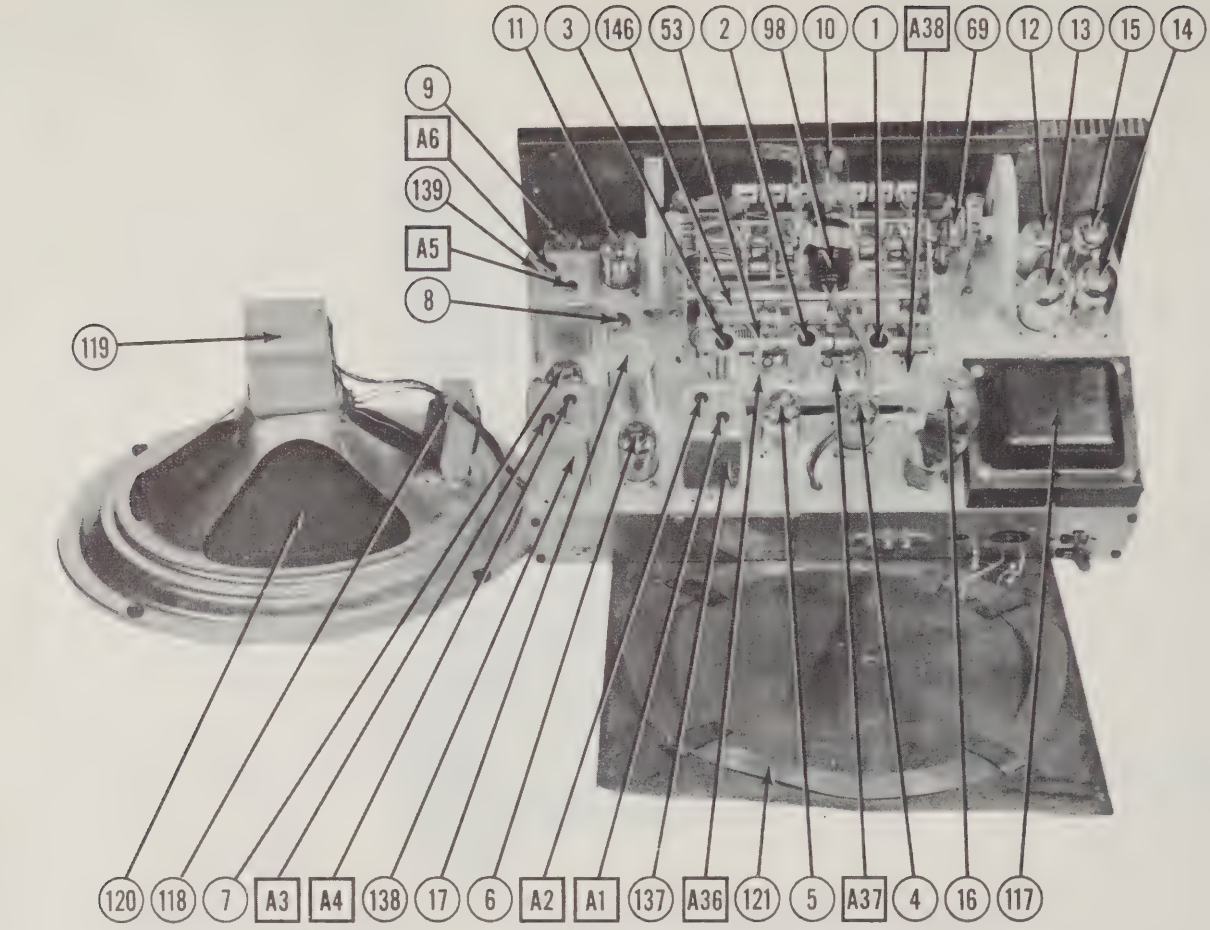
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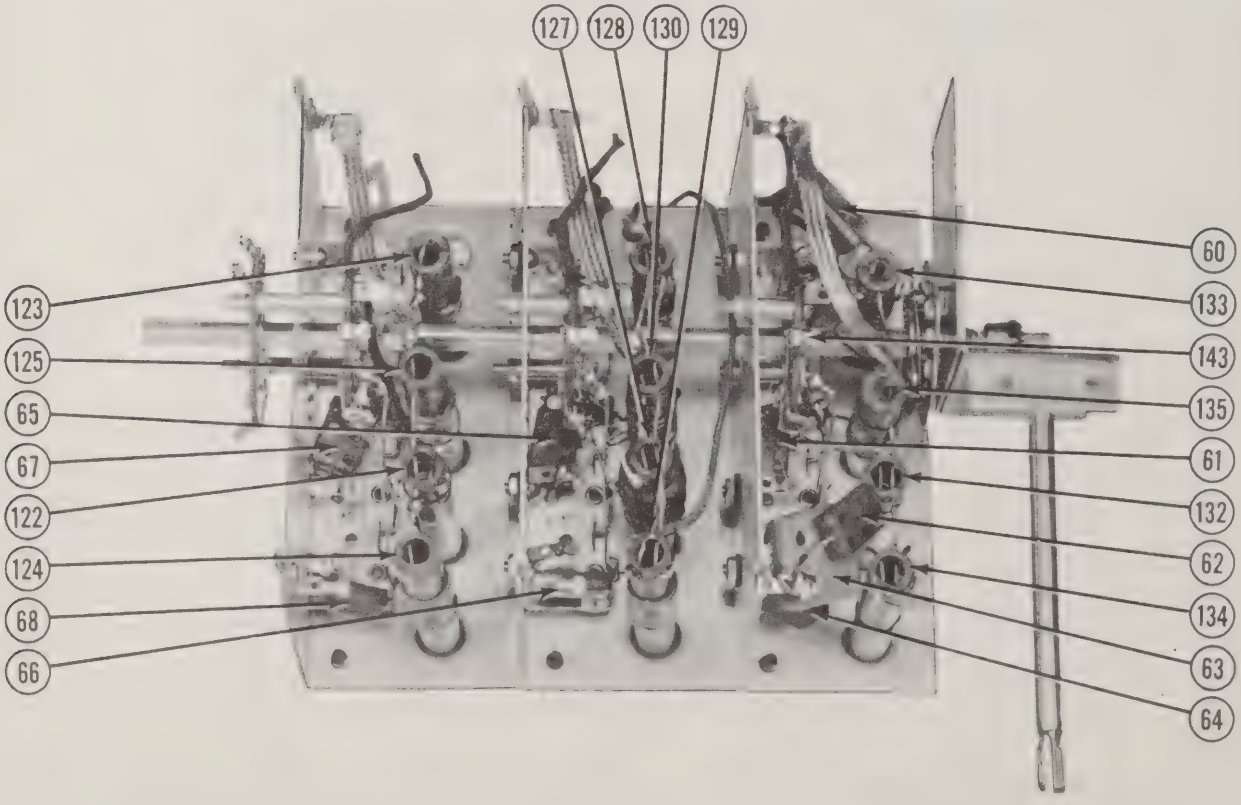
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MIDWEST MODELS R-16,
RG-16, RT-16 (Ch. RGT-16) PAGE 3

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	6BA6	6BA6	7BK	
2	FM Converter	6BE6	6BE6	7CH	
3	FM AFC	6C4	6C4	6BG	
4	AM RF Amp.	7A7	7A7	8V	
5	AM Converter	7Q7	7Q7	8AL	
6	1st IF Amp.	7A7	7A7	8V	
7	2nd IF Amp.	7A7	7A7	8V	
8	FM Detector	6AL5	6AL5	6BT	
9	AM Detector	7A6	7A6	7AJ	
10	Tuning Eye	6U5	6U5	6R	
11	1st AF	7A4	7A4	5AC	
12	2nd AF	7A4	7A4	5AC	
13	Inverter	7A4	7A4	5AC	
14	Power Output	7C8	7C8	6AA	
15	" "	7C5	7C5	6AA	
16	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
17A	40	450	CE6	AF88J	UP4445	DY-3x40-450	EL-240	▲ Filter
B	40	450						▲ "
18	40	25	CE4	PRS25/50	BR502	M-50-25	TA-50	Cathode bypass
19	8	150	CE7	PRS150/8	BR815	M-8-150	UT-81	Stabilizing Cap.
20	.01	800		684-01	DT6S1	MPH-6-01	TC-11	Line Filter
21	.01	800		684-01	DT6S1	MPH-6-01	TC-11	" "
22	.05	200		484-05	DT2S5	ST-4-05	TC-15	Tone Compensation
23	.05	200		484-05	DT2S5	ST-4-05	TC-15	Feedback
24	.01	800		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
25	.01	200		484-01	DT2S1	ST-4-01	TC-11	Tone Compensation
26	.01	200		484-01	DT2S1	ST-4-01	TC-11	" "
27	.01	800		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
28	.01	200		484-01	DT2S1	ST-4-01	TC-11	Tone Compensation
29	.01	200		484-01	DT2S1	ST-4-01	TC-11	Audio Coupling
30	.01	800		684-01	DT6S1	ST-6-01	TC-11	" "
31	.01	800		684-01	DT6S1	ST-6-01	TC-11	2nd IF Plate Decoup.
32	.01	800		684-01	DT6S1	ST-6-01	TC-11	2nd IF Screen Bypass
33	.01	200		484-01	DT2S1	ST-4-01	TC-11	Audio Coupling
34	.01	200		484-01	DT2S1	ST-4-01	TC-11	AVC Filter
35	.01	800		684-01	DT6S1	ST-6-01	TC-11	RF Bypass Power Supply
36	.01	800		684-01	DT6S1	ST-6-01	TC-11	1st IF Screen Bypass
37	.01	200		484-01	DT2S1	ST-4-01	TC-11	AVC Filter
38	.01	800		684-01	DT6S1	ST-6-01	TC-11	RF Bypass Power Supply
39	.01	800		684-01	DT6S1	ST-6-01	TC-11	RF Bypass Power Supply
40	.01	200		484-01	DT2S1	ST-4-01	TC-11	AVC Filter
41	.01	200		484-01	DT2S1	ST-4-01	TC-11	AFC Cathode Bypass
42	.01	800		684-01	DT6S1	ST-6-01	TC-11	AM Conv. Screen Bypass
43	.01	800		684-01	DT6S1	ST-6-01	TC-11	AM RF Screen Bypass
44	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	Output Grid Bypass
45	100	300		1469-0001	5R5T1	MOS.5-31	MS-31	Diode Load Cap.-Cer.-Note
46	100	300		1469-0001	5R5T1	MOS.5-31	MS-31	Diode Load Cap.-Cer.-Note
47	2000	300		1467-002	1W5D2	MW.5-22	1FM-22	De-emphasis-Cer.
48	3	600						Equalizing Cap.-Cer.
49	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	AM Osc. Grid Cap.-Cer.
50	5	300		1468-000005	5W5V5	MO.5-55	MS-55	Phase Shift Cap.-Cer.
51	5	300		1468-000005	5W5V5	MO.5-55	MS-55	Osc. Coupling-Cer.
52	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	FM Osc. Grid Cap.-Cer.
53	200	300		1468-0002	5R5T2	MOS.5-32	MS-32	Fixed Padder-Cer.
54	1000	300		1468-001	1W5D1	MO.5-21	1FM-21	FM Conv. Screen Byp.-Cer.
55	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	FM RF Coupling-Cer.
56	1000	300		1468-001	1W5D1	MO.5-21	1FM-21	RF Bypass Power Supply-Cer
57	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	FM RF Screen Bypass-Cer.
58	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	FM RF Cathode Bypass-Cer.
59	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	Filament Bypass-Cer.
60	1050	500						Fixed Padder
61	75	500		1469-000075				Fixed Trimmer

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
112	10KΩ	½		BTS-10K	Br.-Blk.-Or. Feedback
113	39Ω	1		BW-1-39	Or.-White-Blk. Filament Dropping-See Note
114	270Ω	3		AB-250	Red-Vi.-Br. Surge Limiter-See Note
115	10Ω	½		BW-½-10	Br.-Blk.-Blk. Series Pilot Light-See Note
116	10Ω	½		BW-½-10	Br.-Blk.-Blk. " " " "
150	2200Ω	½		BTS-2200	Red-Red-Red AFC Cathode

Note-Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
117	117V AC @ .81A	620V CT .93A DC	5.2V AC @ 3.0A	6.3V AC @ 4.0A	TP-8	P-6314#	T-22R07#	P-2955#

#Add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
118	9000Ω CT	5.0Ω	390Ω CT	.3Ω	Part of SP-2	A-3824	T22S56	A-2904‡	‡Drill one new mounting hole

SPEAKER

ITEM No.	RATINGS	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD RES. 500Ω / VC IMP. 5.0Ω				
119	CONE DIA. 11½" / VC DIA. 1"	SP-2			
120					

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: MEISSNER PART No.	
121	Loop Ant.	0Ω	1.3Ω			
122	Loop Load. Coil		.7Ω			
	Band					
123	Ant.Coil C	.8Ω	.5Ω			
124	" " D	.6Ω	0Ω			
125	" " E	.2Ω	0Ω			
126	" " A	.7Ω	0Ω			
127	RF " B	87Ω	2.8Ω			
128	" " C	.8Ω	.6Ω			
129	" " D	.6Ω	0Ω			
130	" " E	.4Ω	0Ω			
131	" " A		0Ω			
132	Osc. " B	.6Ω	5.6Ω			
133	" " C	.4Ω	.7Ω			
134	" " D	.3Ω	.2Ω			
135	" " E	0Ω	0Ω			
136	" " A		0Ω			
137A	AM 1st IF	6.6Ω	9Ω†	TR-11		†Includes both secondaries.
B	FM " "		1.8Ω			
138A	AM 2nd IF	9Ω*	9Ω†	TR-12		*Includes both primaries.
B	FM " "					
139A	AM 3rd IF	9.6Ω*	6.4Ω	TR-13		
B	FM Det. Trans.		.1Ω			
140	RF Plate Choke		.1Ω			

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	MIDWEST PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
62	300	500		1469-0003	5R5T3	MOS.5-33	MS-33	Fixed Padder
63	4100	500						" "
64	51	500						Fixed Trimmer
65	130	500		1469-0001	2R5T1	MOS.5-31	MS-31	" "
66	91	500						" "
67	130	500						" "
68	91	500						" "
147	200	300		1468-0002	5W5T2	MO.5-32	1FM-32	RF Coupling
148	200	500		1468-0002	5W5T2	MO.5-32	1FM-32	Diode RF Filter
149	200	500		1468-0002	5W5T2	MO.5-32	1FM-32	" " "

Note-When either item 45 or 46 are replaced, replace both with capacitors of equal value.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESIST-ANCE	WATTS	MIDWEST PART No.	IRC PART No.	CLAROSTAT PART No.	
69	500KΩ	½	RV-6			Volume Control tapped @ 450KΩ
70A	500KΩ	½	RV-5	D11-133	AM-58-S	Tone Control
B	Shaft		Not Req.	E	E	Attach to 70A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MIDWEST PART No.	IRC PART No.	
71	100Ω	½			Br.-Blk.-Br. FM RF Cathode
72	100KΩ	½		BTS-100K	Br.-Blk.-Yl. FM RF Screen
73	1MΩ	½			Br.-Blk.-Blk. Parasitic Supp.
74	2.2MΩ	½		BT-2-22K	Red-Red-Or. FM Conv. Screen
75	22KΩ	½		BTS-22K	Red-Red-Or. FM Osc. Grid
76	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AFC Grid
77	47KΩ	1		BTA-47K	Yl.-Vi.-Or. AFC Plate Load
78	2.2 Meg.	½		BTS-2.2 Meg	Red-Red-Grn. AM RF Grid
79	82KΩ	½		BTS-82K	Gray-Red-Or. AM RF Screen
80	1MΩ	½			Br.-Blk.-Blk. Parasitic Supp.
81	22KΩ	½		BT-2-22K	Red-Red-Or. AM Conv. Screen
82	22KΩ	½		BTS-22K	Red-Red-Or. AM Osc. Grid
83	220Ω	½			Red-Red-Br. 1st IF Cathode
84	470Ω	½		BTS-470	Yl.-Vi.-Br. 1st IF Screen Decoup.
85	150KΩ	½		BTS-150K	Br.-Grn.-Yl. AVC Network
86	220Ω	½			Red-Red-Br. 2nd IF Cathode
87	470Ω	½		BTS-470	Yl.-Vi.-Br. 2nd IF Plate Decoup.
88	47KΩ	1		BTA-47K	Yl.-Vi.-Or. Voltage Dropping
89	15KΩ	½		BTS-15K	Br.-Grn.-Or. Diode Filter
90	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Diode Load
91	22KΩ	½		BTS-22K	Red-Red-Or. De-emphasis
92	15KΩ	½		BTS-15K	Br.-Grn.-Or. Ratio Det. Diode Load
93	15KΩ	½		BTS-15K	Br.-Grn.-Or. " " " "
94	1.5 Meg.	½		BTS-1.5 Meg	Br.-Grn.-Grn. AVC Network
95	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AFC Network
96	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. FM AF Load
97	12KΩ	½		BTS-12K	Br.-Red-Or. Tone Comp.
98	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Tuning Eye Plate Load
99	4700Ω	½		BTS-4700	Yl.-Vi.-Red 1st AF Cathode
100	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 1st AF Plate Load
101	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 2nd AF Plate Load
102	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 2nd AF Grid
103	4700Ω	½		BTS-4700	Yl.-Vi.-Red 2nd AF Cathode
104	820KΩ	½		BTS-820K	Gray-Red-Yl. Phase Inv. Grid
105	680KΩ	½		BTS-680K	Blue-Gray-Yl. Phase Inv. Grid
106	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Phase Inv. Plate Load
107	4700Ω	½		BTS-4700	Yl.-Vi.-Red Phase Inv. Cathode
108	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
109	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. " "
110	270Ω	2		AB-270	Red-Vi.-Br. Output Cathode
111	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Tone Comp.

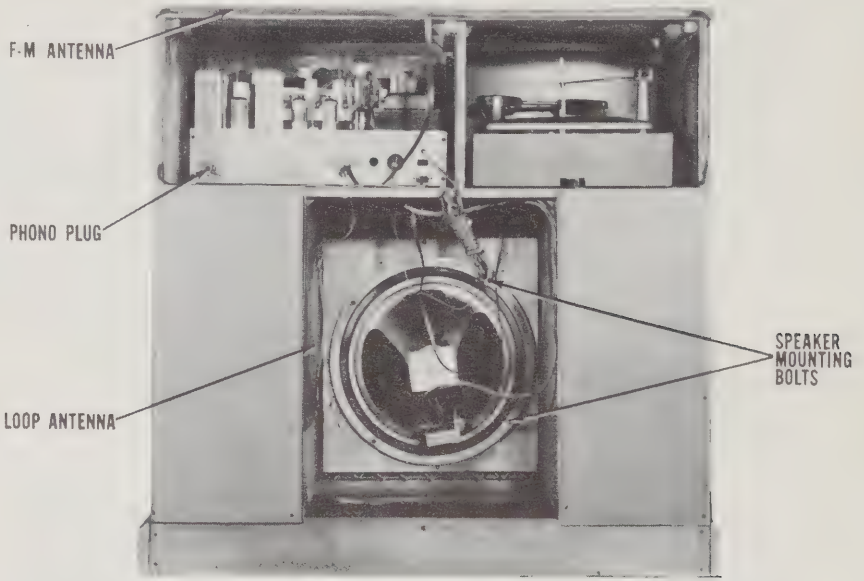
PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MIDWEST PART No.		
141	Screw	6-8	0.25	Blue	IL-1		Type 46
142	"	6-8	0.25	"	IL-1		" "

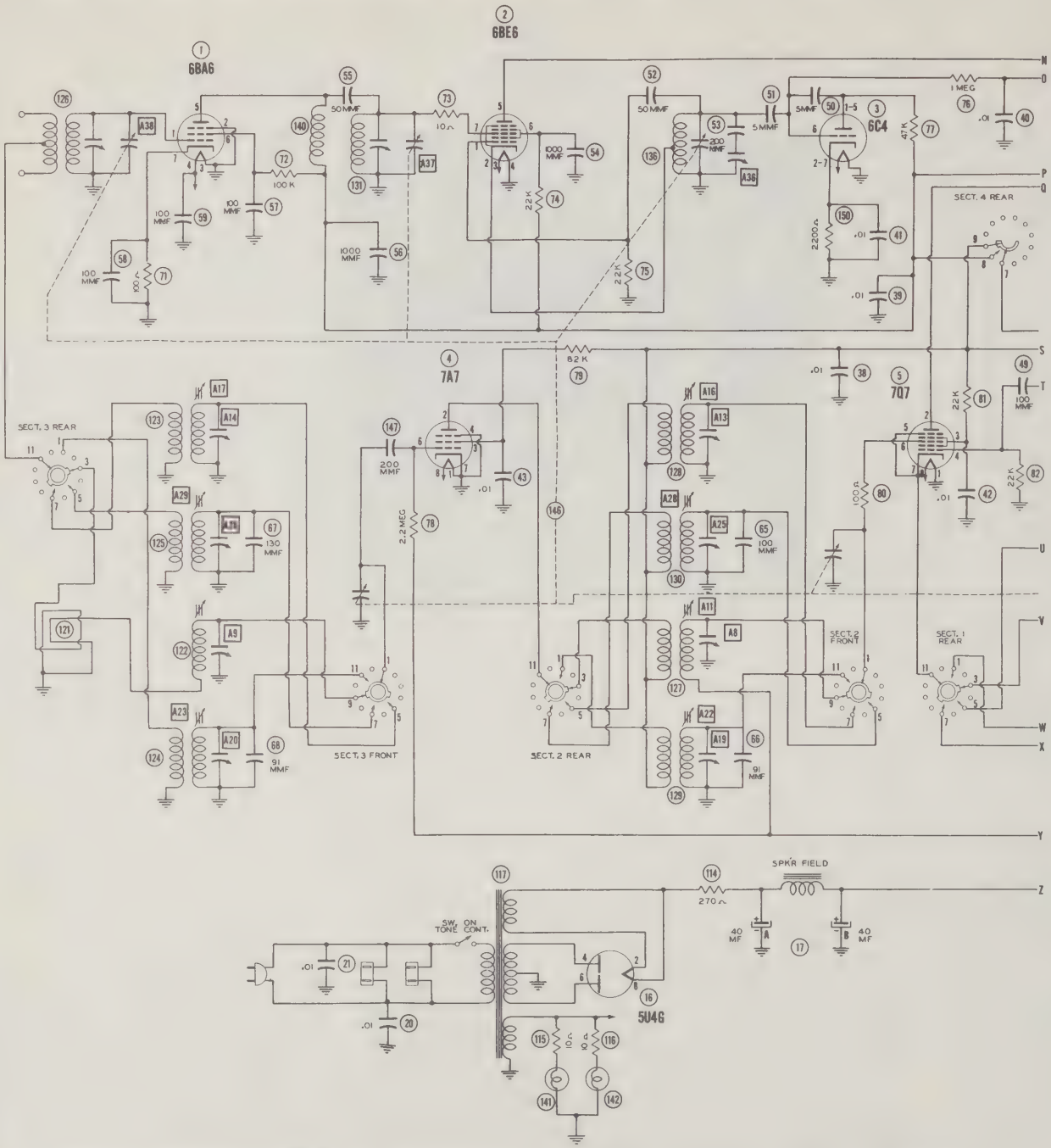
MISCELLANEOUS

ITEM No.	PART NAME	MIDWEST PART No.	NOTES
143	Switch		Band
144	"		Radio-Phono-Telev.
145	"		Tone
146	Tuning Gang	CV-15-2	(13-505MMF, 13-505MMF, 13-350MMF)
	Dial	AD-7	Glass
	Dial Pointer	AP-21	

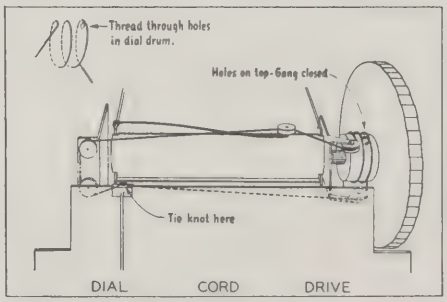


DISASSEMBLY INSTRUCTIONS

1. Remove phono-pickup plug from chassis.
2. Remove loop antenna plug from chassis.
3. Remove FM antenna leads from terminal strip on rear of chassis.
4. Remove speaker plug from chassis.
5. Remove phono-motor plug from chassis.
6. Remove four hex head machine screws holding chassis in cabinet. Remove chassis from cabinet.
7. Remove four Phillips head wood screws holding speaker in cabinet. Remove speaker from cabinet.



STAGE GAIN MEASUREMENTS		
ANTENNA TO RF GRID	60X	600KC
RF GRID TO CONV. GRID	15X	600KC
CONV. GAIN	50X	IN 600KC OUT 456KC
INPUT IF TRANS.	1.8X	456KC
1st IF TUBE	25X	456KC
INTER IF TRANS.	1.5X	456KC
2nd IF TUBE	50X	456KC
OUTPUT IF TRANS.	.4X	456KC
1st AF	1.2X	400 ∿
2nd AF	4X	400 ∿
OUTPUT	14X	400 ∿



The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

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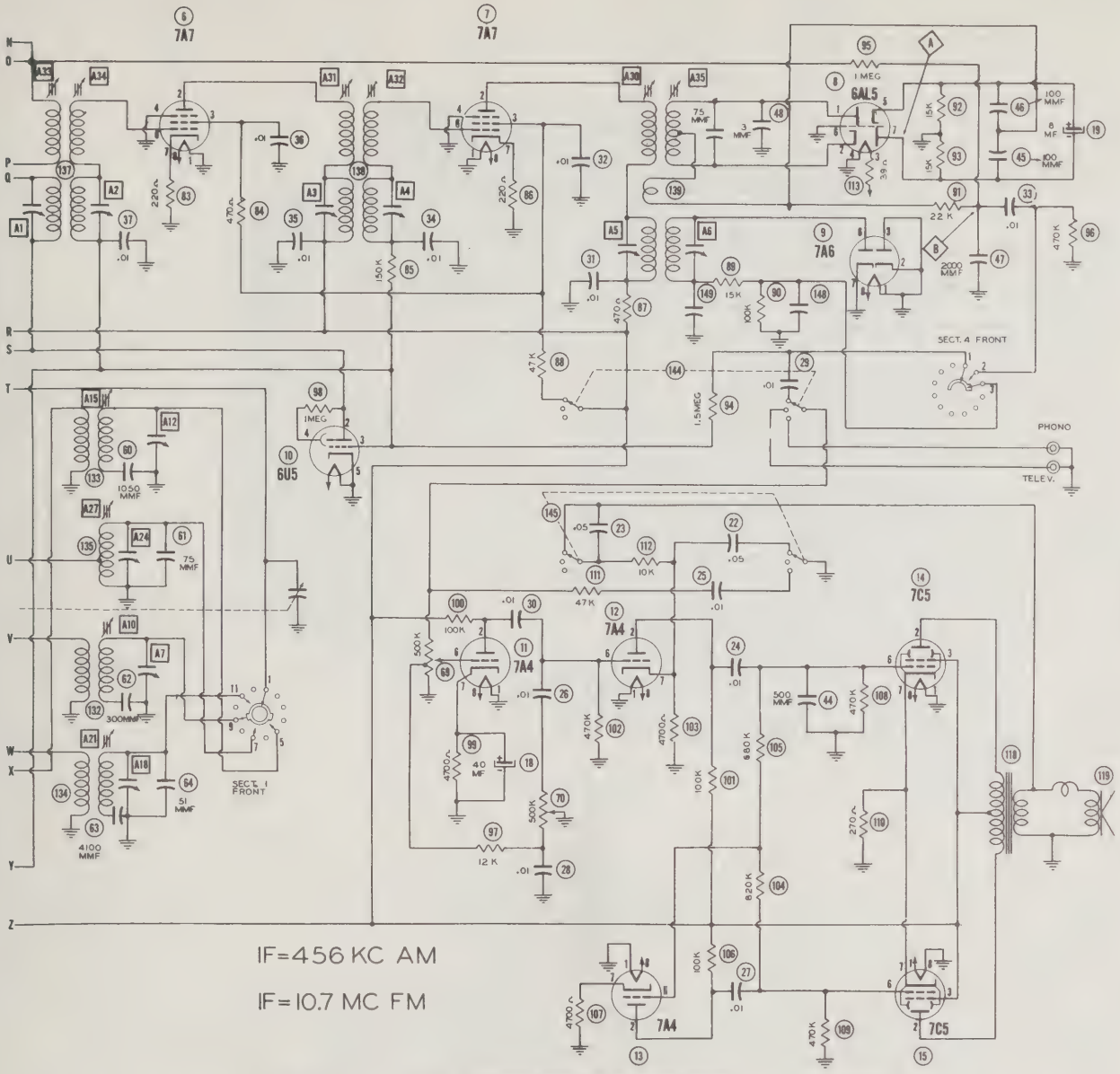

VOLTAGE READINGS — VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	6BA6	0V.	0V.	0V.	6.3VAC	240VDC	50VDC	.6VDC	–
‡ 2	6DB6	-2.2VDC§	0V.	6.3VAC	0V.	240VDC	80VDC	0V.	–
‡ 3	6C4	115VDC	0V.	0V.	6.3VAC	115VDC	0V.	6.4VDC	–
4	7A7	0V.	.40VDC	65VDC	0V.	0V.	-.2VDC	0V.	6.3VAC
5	7Q7	0V.	240VDC	80VDC	-4.2VDC§	0V.	-.6VDC	0V.	6.3VAC
6	7A7	0V.	240VDC	80VDC	0V.	0V.	-.6VDC	1.0VDC	6.3VAC
7	7A7	0V.	240VDC	80VDC	0V.	0V.	-.4VDC	1.8VDC	6.3VAC
‡ 8	6AL5	.2VDC	-.2VDC	6.3VAC	0V.	.2VDC	0V.	-.2VDC	–
9	7A6	0V.	0V.	0V.	0V.	0V.	-3.4VDC	0V.	6.3VAC
10	6U5	–	–	–	–	–	–	–	–
11	7A4	0V.	100VDC	240VDC	0V.	0V.	0V.	5VDC	6.3VAC
12	7A4	0V.	120VDC	0V.	240VDC	5.4VDC	0V.	5.8VDC	6.3VAC
13	7A4	0V.	120VDC	0V.	0V.	0V.	0V.	5.8VDC	6.3VAC
14	7C5	0V.	240VDC	240VDC	0V.	0V.	0V.	17VDC	6.3VAC
15	7C5	0V.	240VDC	240VDC	0V.	0V.	0V.	17VDC	6.3VAC
16	5U4G	0V.	310VDC	0V.	310VAC	250VDC	310VAC	0V.	310VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	6BA6	0Ω	0Ω	0Ω	.1Ω	150KΩ	2MΩ	100Ω	–
‡ 2	6DB6	22KΩ	0Ω	.1Ω	0Ω	150KΩ	170KΩ	10Ω	–
‡ 3	6C4	200KΩ	0Ω	0Ω	.1Ω	200KΩ	INF.	2.2KΩ	–
4	7A7	0Ω	150KΩ	230KΩ	0Ω	0Ω	4 Meg.	0Ω	.1Ω
5	7Q7	0Ω	150KΩ	170KΩ	22KΩ	0Ω	1.6 Meg.	.6Ω	.1Ω
6	7A7	0Ω	150KΩ	200KΩ	0Ω	0Ω	1.6 Meg.	220Ω	.1Ω
7	7A7	0Ω	150KΩ	200KΩ	0Ω	0Ω	1.7 Meg.	2.0Ω	.1Ω
‡ 8	6AL5	INF.	INF.	.1Ω	0Ω	15KΩ	0Ω	15KΩ	–
9	7A6	0Ω	INF.	INF.	0Ω	INF.	115KΩ	0Ω	.1Ω
10	6U5	–	–	–	–	–	–	–	–
11	7A4	0Ω	250KΩ	150KΩ	INF.	420KΩ	500KΩ	4.7KΩ	.1Ω
12	7A4	0Ω	250KΩ	INF.	150KΩ	20KΩ	470KΩ	4.7KΩ	.1Ω
13	7A4	0Ω	250KΩ	INF.	1Ω	INF.	650KΩ	4.7KΩ	.1Ω
14	7C5	0Ω	150KΩ	150KΩ	650KΩ	INF.	470KΩ	270Ω	.1Ω
15	7C5	0Ω	150KΩ	150KΩ	650KΩ	INF.	470KΩ	270Ω	.1Ω
16	5U4G	INF.	150KΩ	INF.	0Ω	150KΩ	0Ω	INF.	150KΩ

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS. THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

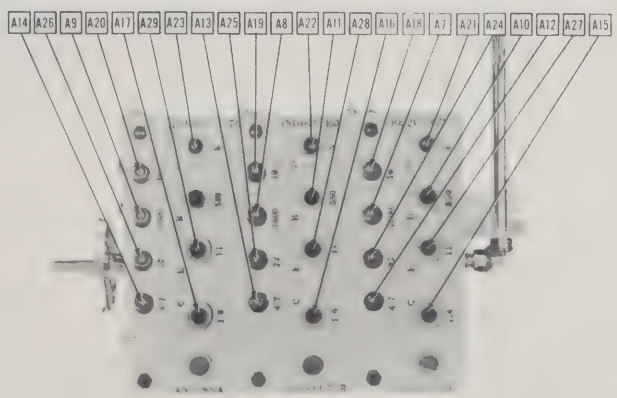
To set pointer turn tuning cap. fully closed and set pointer to left edge of white dial calibration lines.

Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to Pin 6 (grid) of 7Q7. Low side to chassis.	455KC	Band "B"	1000KC	Across voice coil	A1,A2, A3,A4, A5,A6	Adjust for maximum output
2	200MMFD in series with 400Ω carbon res.	High side to terminal "A" on ant. terminal strip. Low side to chassis. Loop must be connected.	1600KC	"	1600KC	"	A7,A8, A9	Adjust for maximum output in order given.
3	"	"	550KC	"	550KC	"	A10, A11	Adjust for maximum output Repeat Steps 2 and 3 until no further improvement can be made.
4	"	"	4.7MC	Band "C"	4.7MC	"	A12	Adjust for maximum output
5	"	"	"	"	Tune for maximum output.	"	A13, A14	Rock tuning cap. and adjust for maximum output.
6	"	"	1.6MC	"	1.6MC	"	A15	Adjust for maximum output
7	"	"	"	"	Tune for maximum output.	"	A16, A17	Rock tuning cap. and adjust for maximum output. Repeat Steps 4, 5, 6 and 7 until no further improvement can be made.
8	"	"	10MC	Band "D"	10MC	"	A18	Adjust for maximum output
9	"	"	"	"	Tune for maximum output.	"	A19, A20	Rock tuning cap. and adjust for maximum output.
10	"	"	5MC	"	5MC	"	A21	Adjust for maximum output
11	"	"	"	"	Tune for maximum output.	"	A22, A23	Rock tuning cap. and adjust for maximum output. Repeat Steps 8, 9, 10 and 11 until no further improvement can be made.
12	"	"	22MC	Band "E"	22MC	"	A24	Adjust for maximum output
13	"	"	"	"	Tune for maximum output.	"	A25, A26	Rock tuning cap. and adjust formaximum output.
14	"	"	11.5MC	"	11.5MC	"	A27	Adjust for maximum output
15	"	"	"	"	Tune for maximum output.	"	A28, A29	Rock tuning cap. and adjust for maximum output. Repeat Steps 12, 13, 14 and 15 until no further improvement can be made.



FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
16	Direct	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	10.7MC (Unmodulated)	Band "A"	100MC	DC probe to Point (A). Common to chassis	A30,A31 A32,A33 A34	Adjust for maximum deflection.
17	Direct	"	"	"	"	DC probe to Point (B). Common to chassis	A35	Adjust for zero deflection. Continue with FM-RF Alignment in Step 19.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
16	.01 MFD	High side to Pin 6 (grid) of 7A7 1st IF Tube (6). Low side to chassis.	10.7MC (Freq. Mod.)	Band "A"	100MC	Vertical input to Point (A). Ground to chassis.	A30,A31 A32	Disconnect 8 MFD cap. from Point (A). Adjust A30, A31 & A32 for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
17	.01 MFD	High side to FM stator of center section of tuning cap. Low side to chassis.	"	"	"	"	A33, A34	Adjust for amplitude, symmetry and coincidence of pattern per Fig. 1. Reconnect 8 MFD cap. to Point (A).
18	.01 MFD	High side to Pin 6 (grid) of 7A7 1st IF Tube (6). Low side to chassis.	"	"	"	Vertical input to Point (B). Ground to chassis.	A35	Adjust for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM-RF Alignment in Step 19.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
19	2-150Ω carbon resistors.	Each side in series with 150Ω resistor to "A" terminals on ant. terminal strip.	105MC (Unmodulated)	Band "A"	105MC	DC probe to Point (A). Common to chassis	A36	Adjust for maximum deflection.
20	"	"	"	"	Tune for maximum deflection.	"	A37,A38	"

FIG. 1

FIG. 2

MOTOROLA MODEL 58L11 (Ch. HS-114)
BATTERY-LINE OPERATED

MOTOROLA MODEL 58L11 (Ch. HS-114)
BATTERY-LINE OPERATED

MOTOROLA MODEL 58L11

TRADE NAME	Motorola, Model 58L11 (Ch. HS-114)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago, Ill.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 3S4 Power Output
POWER SUPPLY RATING	110-120 Volts AC-DC or 3 Volts "A" Supply and 67.5 Volts "B" Supply .1 Amp. @ 117 Volts AC or 150 MA @ 3 Volts DC and 7MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 4 (grid) of 1R5. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200 MMF to reduce hum modulation.
2		Loop	1650KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Reassemble receiver in cabinet.
3		"	1400KC	Tune for maximum output.	"	A5	Adjust for maximum volume.

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PARTS LIST AND DESCRIPTIONS

MOTOROLA MODEL 58L11

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1U4	1U4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3S4	3S4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	40	150	23B75808	PRSA150/40-20	EZ42215	DSB-403020-150	EL-224*	Filter-Red
B	20	150		PRS150-20				" -Blue
C	20	150						" -Or.
6	25	25	23A25888	PRS25/100	BRH251	M-100-25	UHC-102	Filament Bypass
7	.05	400	8K14791	484-05	DT4S5	ST-4-05	TC-15	Line Filter
8	.006	100	8C4529	484-006	DT6D6	ST-6-006	TC-26	Output Plate Bypass
9	.006	100	8C4529	484-006	DT6D6	ST-6-006	TC-26	Audio Coupling
10	.02	100	8K471628	484-02	DT2S2	ST-4-02	TC-12	AF Screen Bypass
11	.006	100	8C4529	484-006	DT6D6	ST-6-006	TC-26	Audio Coupling
12	.02	100	8K471628	484-02	DT2S2	ST-4-02	TC-12	RF Bypass Pwr. Supply
13	.05	100	8K14791	484-05	DT2S5	ST-4-05	TC-15	Filament Bypass
14	.05	100	8K14791	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
15	.02	100	8K471628	484-02	DT2S2	ST-4-02	TC-12	Conv. Screen Decoup.
16	100	500	21B77286	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass-Cer.
17	100	500	21B77286	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.
18	50	500	21K77373	1466-00005	5W5S5	MO.5-45	1FM-45	IF Coupling-Cer.

*Use insulated sleeve.

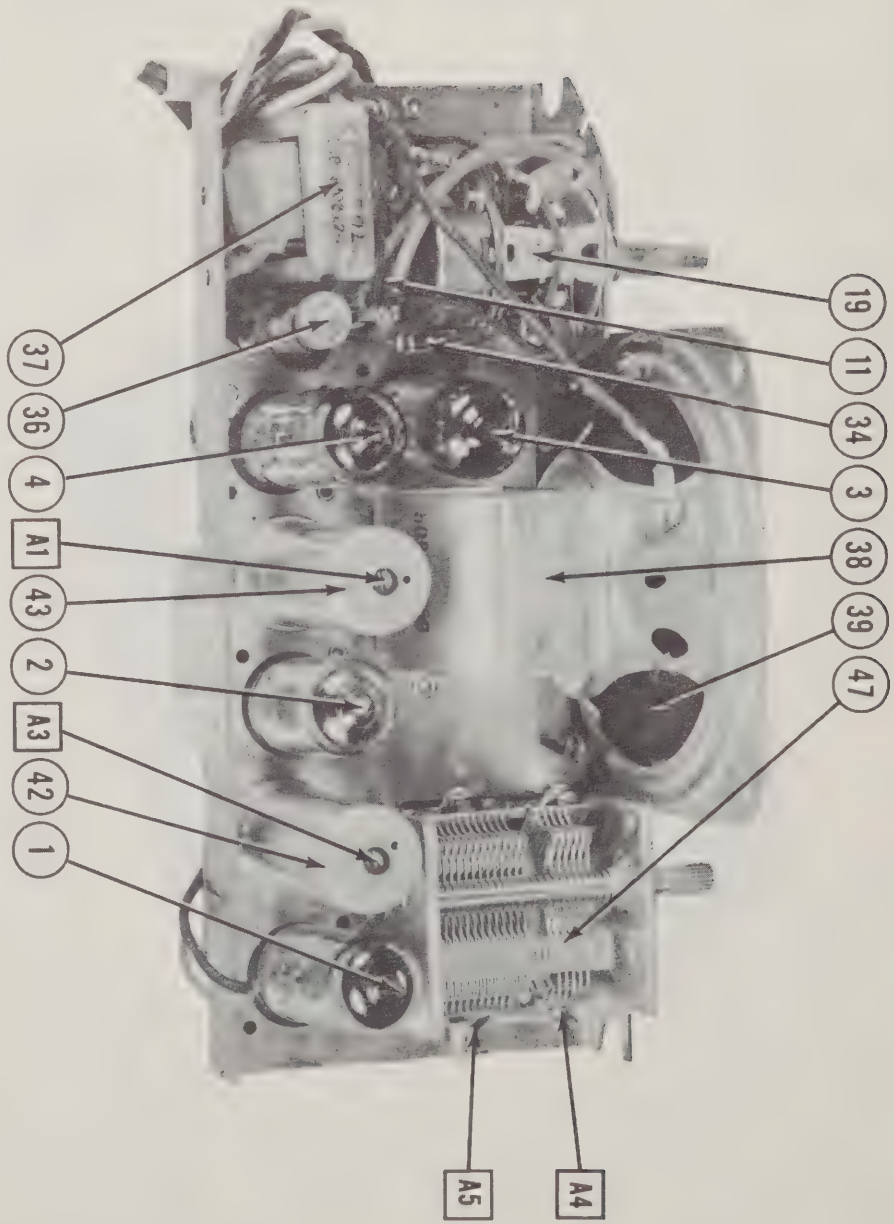
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
19A	1 Meg.	½	18B480049			Volume Control
B	Switch	½				Power Change Over Switch — Dual Unit

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	IDENTIFICATION CODES
20	100KΩ	½	6R6031	BTS-100K	Br.-Blk.-Yl. Osc. Grid
21	22KΩ	½	6R6397	BTS-22K	Red-Red-Or. Conv. Screen Decoup.
22	390Ω	½	6R5554	BW-½-390	Or.-White-Br. Filament String
23	10 Meg.	½	6R2109	BTS-10 Meg.	Br.-Blk.-Blue IF Grid
24	27Ω	½	6R6683	BW-½-27	Red-Vi.-Blk. Fil. String
25	3.3 Meg.	½	6R2118	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
26	33KΩ	½	6R6012	BTS-33K	Or.-Or.-Or. Diode Filter
27	10 Meg.	½	6R2109	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
28	4.7 Meg.	½	6R2122	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen
29	1 Meg.	½	6R6004	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
30	3.3 Meg.	½	6R2118	BTS-3.3 Meg.	Or.-Or.-Grn. Output Grid
31	820Ω	½	6R6269	BTS-820	Gray-Red-Br. Bias
32	680Ω	½	6R6040	BTS-680	Blue-Gray-Br. Fil. String
33	270Ω	½	6R6432	BW-½-270	Red-Vi.-Br. " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MOTOROLA PART No.	IRC PART No.	
34	3300Ω	½	8R55-1	BTS-3300	Or.-Or.-Red Filter
35	150Ω	2½	17A76986	AB-150	Surge Limiter
36A	1000Ω	5	17A470618	ABA-2000	Fil. Dropping
B	1000Ω				" "

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MOTOROLA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
37	5700Ω	3.1Ω	365Ω	.5Ω	25B470662				

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	
38	FIELD / PM	VC IMP. / 3.1Ω	50B482759		3A07#	#Drill and tap magnet frame.
39	CONE DIA. / 3-3/8"	VC DIA. / 1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	
40	Loop Ant.		3.2Ω	24B480092		
41	Osc. Coil	2.7Ω	11.8Ω	24A478022	14-1060†	†Add 50 MMFD from high side of tuning capacitor to oscillator grid.
42	Input IF	29.2Ω	29.7Ω	24B480042	16-6668	
43	Output IF	44Ω	44.3Ω	24B480040	16-6669	

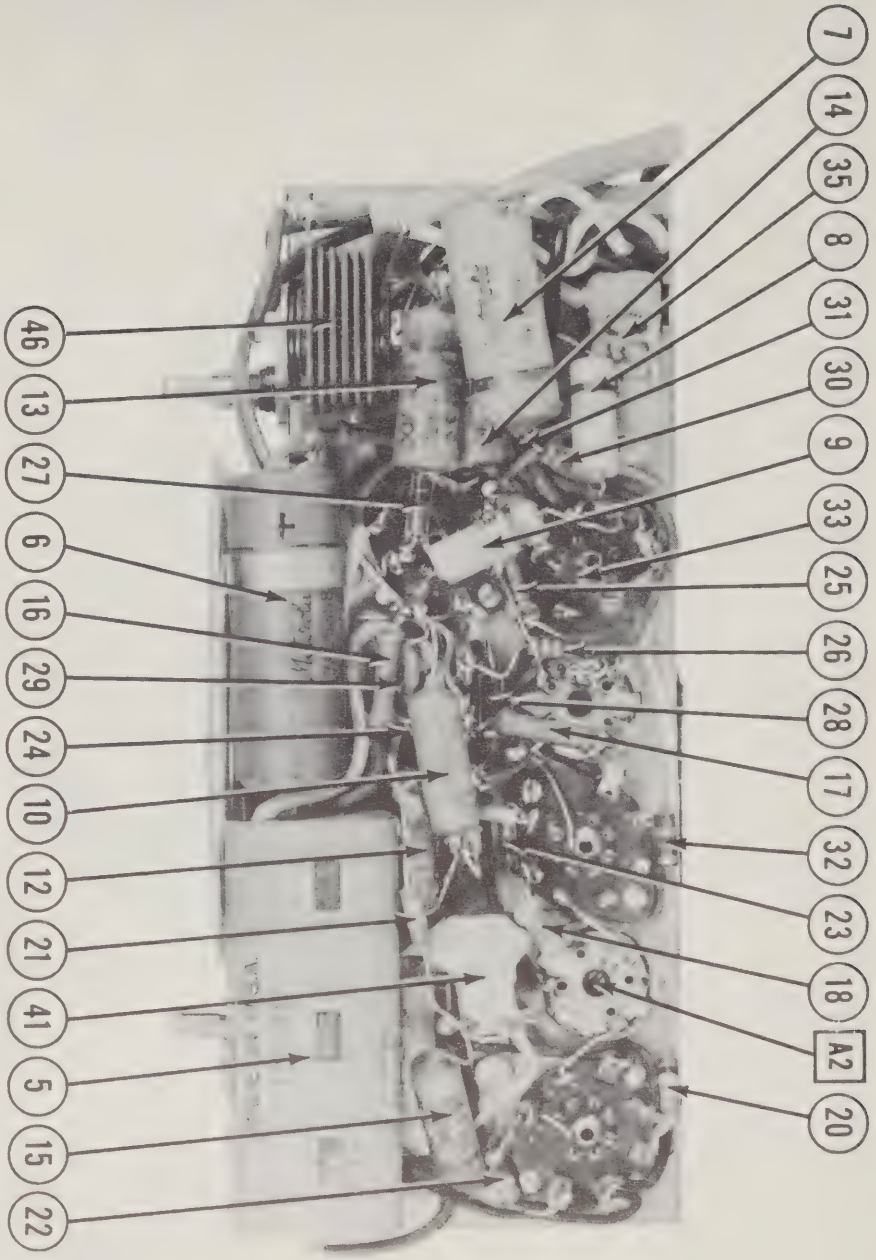
BATTERIES

ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
44	3 V. "A"		#950			#2R			2 Used in Series
45	67.5V "B"			#467			XX15		

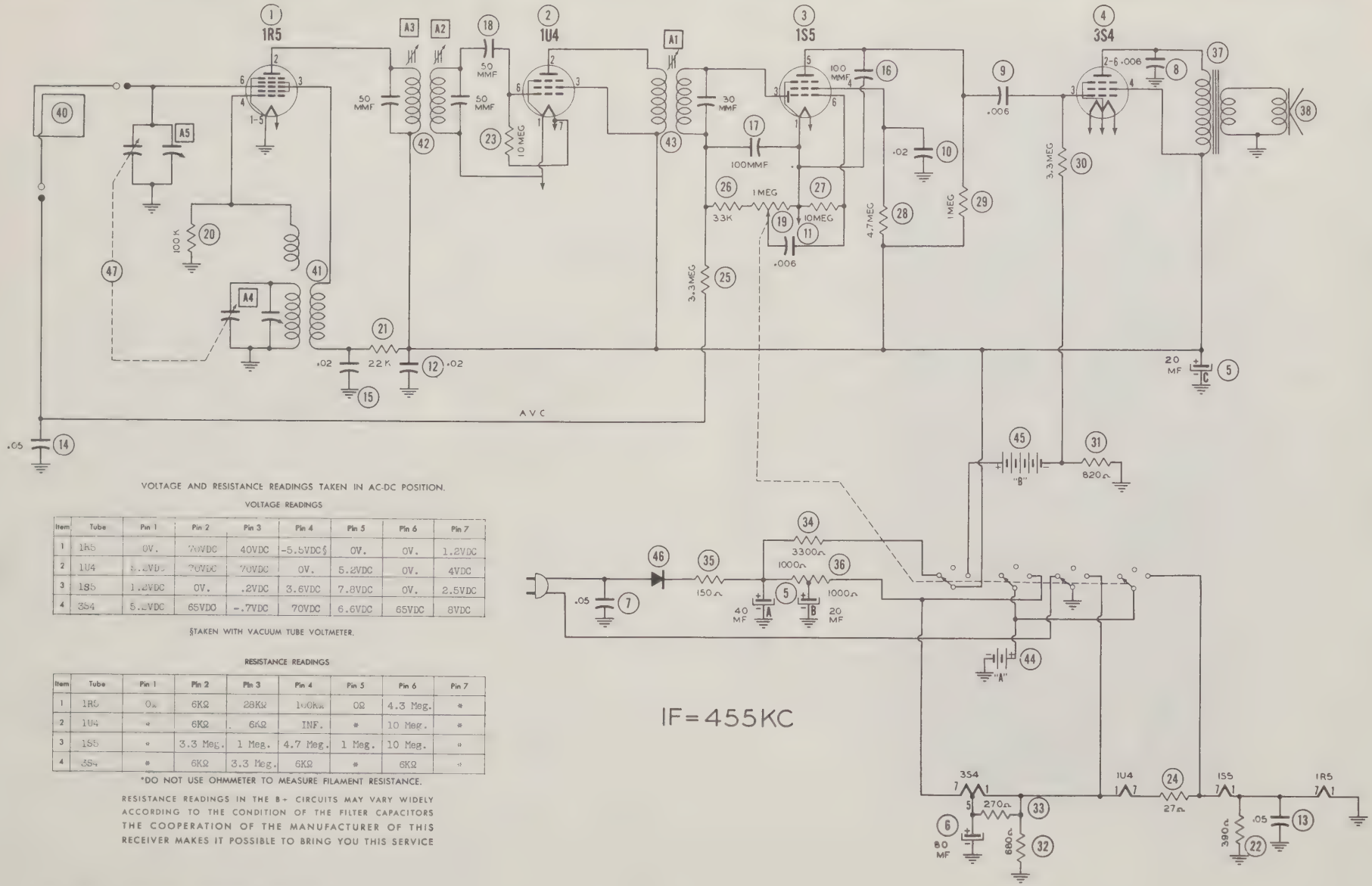
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
46	Rectifier	4B47511	Selenium
47	2 Gang Var. Cap.	19K480051	(20-378MMF, 10-100 MMF)

CHASSIS—BOTTOM VIEW



DATE 9/48-#4815-17
SET #45-FOLDER #17
MOTOROLA MODEL 58L11



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	70VDC	40VDC	-5.5VDC§	0V.	0V.	1.2VDC
2	1U4	5.2VDC	70VDC	70VDC	0V.	5.2VDC	0V.	4VDC
3	1S5	1.2VDC	0V.	.2VDC	3.6VDC	7.8VDC	0V.	2.5VDC
4	3S4	5.2VDC	65VDC	-.7VDC	70VDC	6.6VDC	65VDC	8VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	6KΩ	28KΩ	100Kω	0Ω	4.3 Meg.	*
2	1U4	*	6KΩ	6KΩ	INF.	*	10 Meg.	*
3	1S5	*	3.3 Meg.	1 Meg.	4.7 Meg.	1 Meg.	10 Meg.	*
4	3S4	*	6KΩ	3.3 Meg.	6KΩ	*	6KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4815-17

1 - DC Voltage measurements are at 20,000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolsrance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

MOTOROLA MODEL 68L11 (Ch. HS-119)
BATTERY-LINE OPERATED

MOTOROLA MODEL 68L11 (Ch. HS-119)
BATTERY-LINE OPERATED

MOTOROLA MODEL 68L11

TRADE NAME	Motorola, Model 68L11 (Ch. HS-119)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago, Ill.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 1U4 RF Amp., 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 3V4 Power Output.
POWER SUPPLY	110-120 Volts AC/DC or 9 Volts "A" Supply and 90 Volts "B" Supply in Pack Form
RATING	.1 Amp. @ 117 Volts AC or 59MA @ 9 Volts DC and 7.5 MA @ 90 Volts DC
TUNING RANGE--BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 6 (grid) of 1R5. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200MMF to reduce hum modulation.
2	200MMFD	High side to Pin 6 (grid) of 1U4 RF Tube (1). Low side to B-.	1400KC	1400KC	"	A5	Adjust for maximum output.
3	200MMFD	"	"	Tune for maximum output.	"	A6	" " " "
4	200MMFD	"	600KC	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 3 and 4 until no further improvement can be made. Reassemble receiver in cabinet.
5				Weak station near 1400KC.		A8	Adjust for maximum volume.

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DATE 9/48-#4815-18 SET #45-FOLDER #18

PARTS LIST AND DESCRIPTIONS

MOTOROLA MODEL
68L11 (Ch. HS-119)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	1U4	1U4	6AR	
2	Converter	1R5	1R5	7AT	
3	IF Amp.	1U4	1U4	6AR	
4	Det.-AVC-AF	1S5	1S5	6AU	
5	Power Output	3V4	3V4	42X	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	23K76988	AF886D4A	UP7DJ63	DY-401	5L-443	● Filter
B	20	150		PRS50/25		M-100-25	TA-50	▲ "
C	40	150						■ "
D	80	25						Filament Bypass
7	.05	400	8S9816	484-.05	DT4S5	ST-4-05	TC-15	Line Filter
8	.002	400	8S9824	484-.002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
9	.005	600	8S9813	684-.005	DT6D5	ST-6-005	TC-25	Audio Coupling
10	.05	100	8S9805	484-.05	DT2S5	ST-4-05	TC-15	AF Plate Decoupling
11	.05	100	8S9805	484-.05	DT2S5	ST-4-05	TC-15	AF Screen Bypass
12	.05	100	8S9805	484-.05	DT2S5	ST-4-05	TC-15	Fil. Bypass
13	.005	600	8S9813	684-.005	DT6D5	ST-6-005	TC-25	Audio Coupling
14	.05	100	8S9805	484-.05	DT2S5	ST-4-05	TC-15	IF Grid Filter
15	.1	200	8S9806	484-.1	DT2P1	ST-2-1	TC-1	RF Bypass Power Supply
16	.05	100	8S9805	484-.05	DT2S5	ST-2-05	TC-15	Conv. Screen Decoup.
17	.05	100	8S9805	484-.05	DT2S5	ST-2-05	TC-15	AVC Filter
18	.05	100	8S9805	484-.05	DT2S5	ST-2-05	TC-15	" "
19	.002	400	8S9824	484-002	DT6D2	ST-6-002	TC-22	Handle Isolation-Note 1
20	.15	200	1A77283	484-.1	DT2P1	ST-2-1	72P2	Line Isolation-Note 2
21	100	500	21B77286	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
22	100	500	21B77286	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
23	1.5		21B77267					Osc. Coupling
24	100	500	21R6641	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling

Note 1-Connected from handle of cabinet to chassis.
Note 2-Wind same number of turns on replacement as were on original part.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
25A	1 Meg.	½	1GA480103	D13-137*	M-63-Z*	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 25A per instructions
C	Switch		" "	42	SW-A2	" " " " "

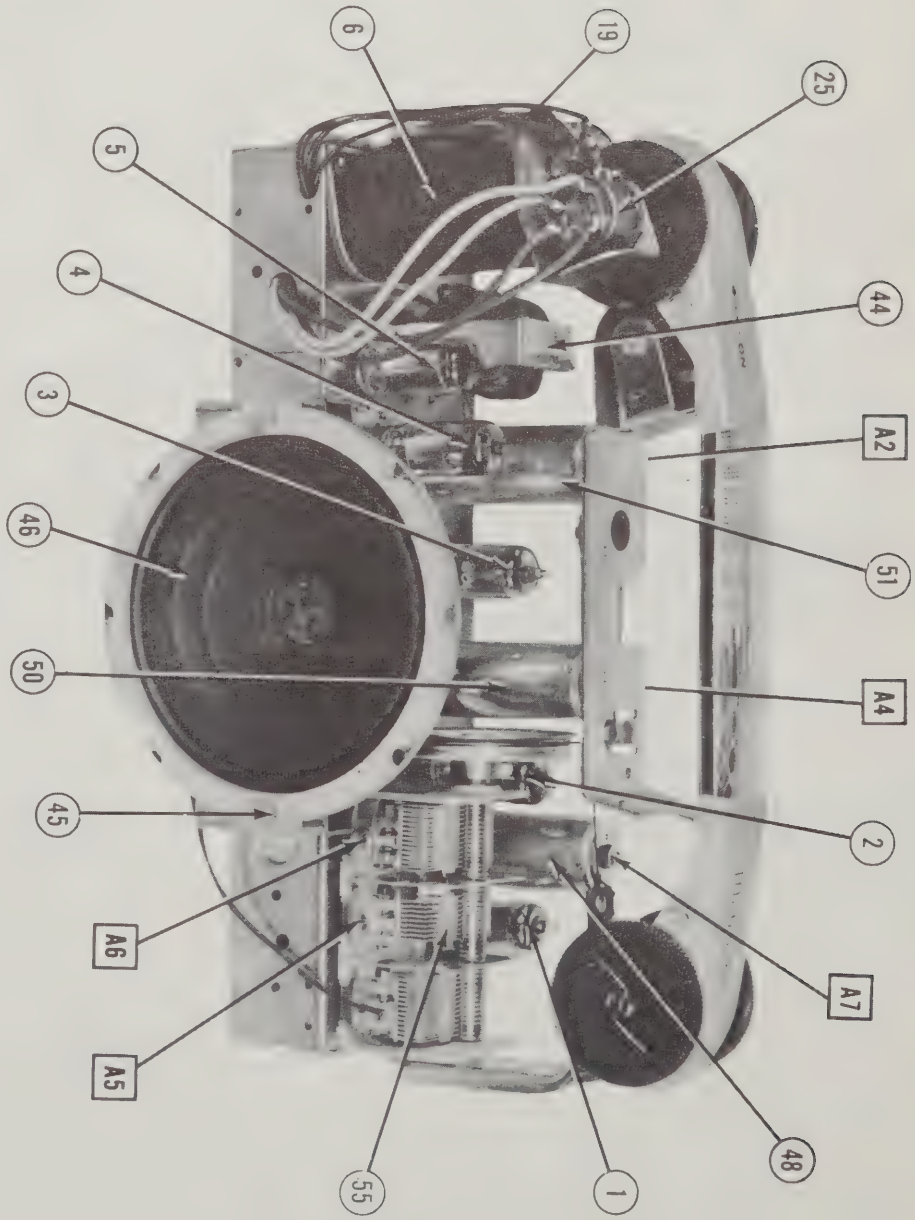
*File shaft to duplicate original. Use original sleeve on this replacement.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	IDENTIFICATION CODES
26	3.3 Meg.	½	6R2118	BTS-3.3 Meg.	Or.-Or.-Grn. RF Grid
27	2.2 Meg.	½	6R3927	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
28	5.6 Meg.	½	6R3988	BTS-5.6 Meg.	Grn.-Blue-Grn. " "
29	1 Meg.	½	6R6004	BTS-1 Meg.	Br.-Blk.-Grn. " "
30	100K	½	6R6075	BTS-100K	Br.-Blk.-Yl. Osc. Grid
31	220Ω	½	6R3933	BW-½-220	Red-Red-Br. Fil. String
32	33KΩ	½	6R6012	BTS-33K	Or.-Or.-Or. Conv. Screen
33	8.2 Meg.	½	6R5585	BTS-8.2 Meg.	Gray-Red-Grn. IF Grid
34	6.8 Meg.	½	6R3987	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
35	3.3 Meg.	½	6R2118	BTS-3.3 Meg.	Or.-Or.-Grn. AF Screen
36	1 Meg.	½	6R6004	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
37	220KΩ	½	6R6015	BTS-220K	Red-Red-Yl. AF Plate Decoup.
38	2.2 Meg.	½	6R3927	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
39	250Ω	½	6R2088	BW-½-250	Red-Grn.-Br. Fil. String
40	500Ω	½	6R5632	BTS-470	Grn.-Blk.-Br. " "
41	150Ω	2½	17A76986	AB-150	Surge Limiter
42A	1030Ω	5	17K76968	AB-1250	Filament Dropping-See Note
B	1030Ω	5	6R6269	ABA-1250	" " " "
43	820Ω	½		BTS-820	Gray-Red-Br. Filter

Note-On IRC replacement set slider 1030Ω from end.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MOTOROLA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
44	10KΩ	3.2Ω	720Ω	.7Ω	25B76952	A-3879#	T22S47#	A-2932#	#Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-107		
45A	PM	3.2Ω	50K480198	Mod. P5-V	5A15	
B	PM		50C76953			
	CONE DIA.	VC DIA.				
46A	4½"	9/16"				
B	4½"					

R F COILS

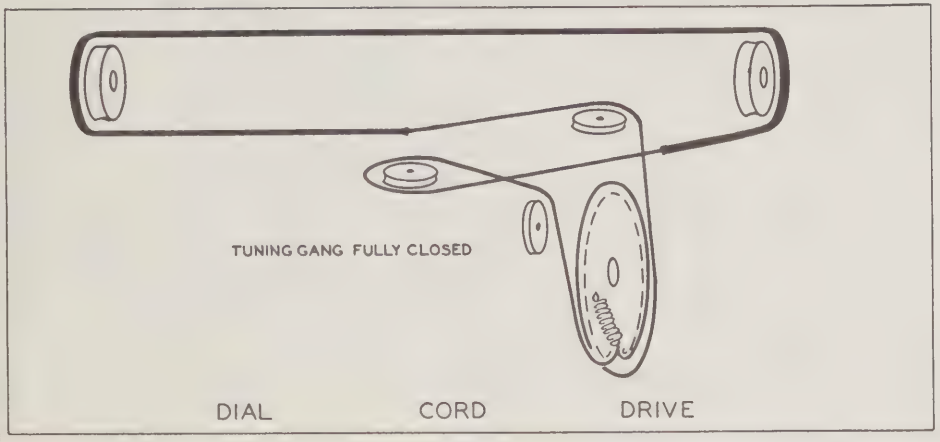
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	
47	Loop Ant.		2.3Ω	24C480184		
48	RF Coil	195Ω	6.3Ω	24B76998		
49	Osc. Coil	2.7Ω	8.3Ω	24A76943	14-1060†	†Add 50MMFD from high side of tuning capacitor to oscillator grid.
50	Input IF	26Ω	25.8Ω	24B76990	16-6678	
51	Output IF	26.2Ω	26Ω	24B77264	16-6678	

BATTERIES

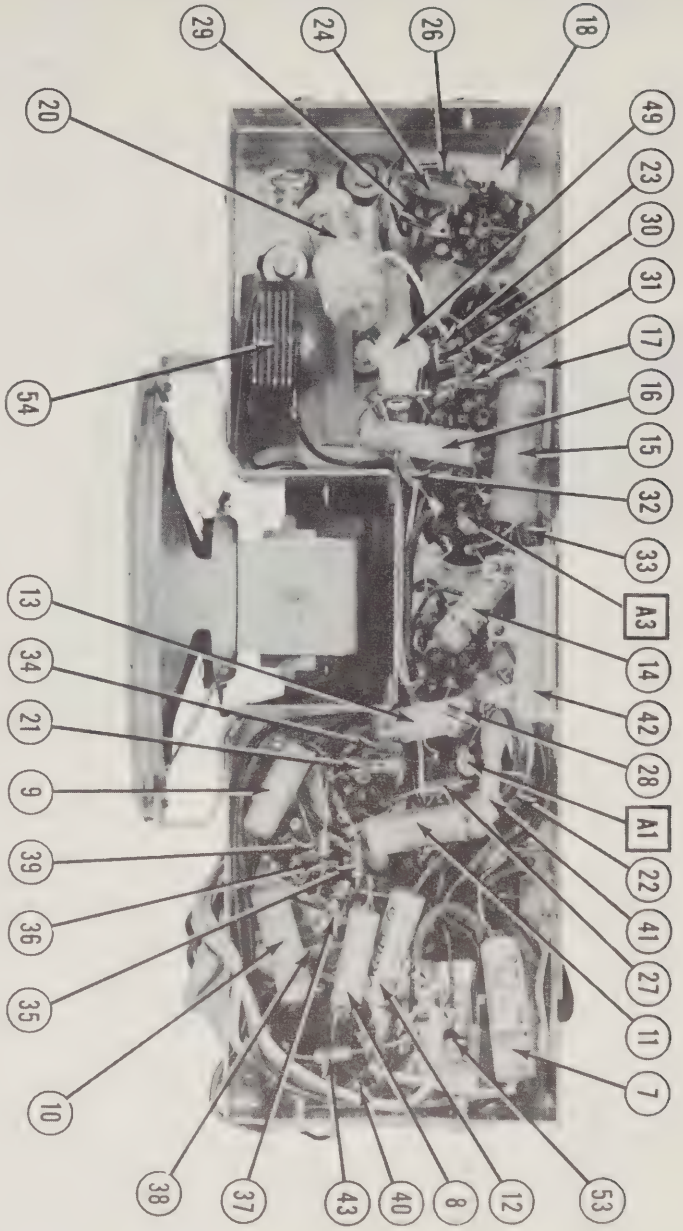
ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
52	9V "A" 90V "B"				753			F6A60	

MISCELLANEOUS

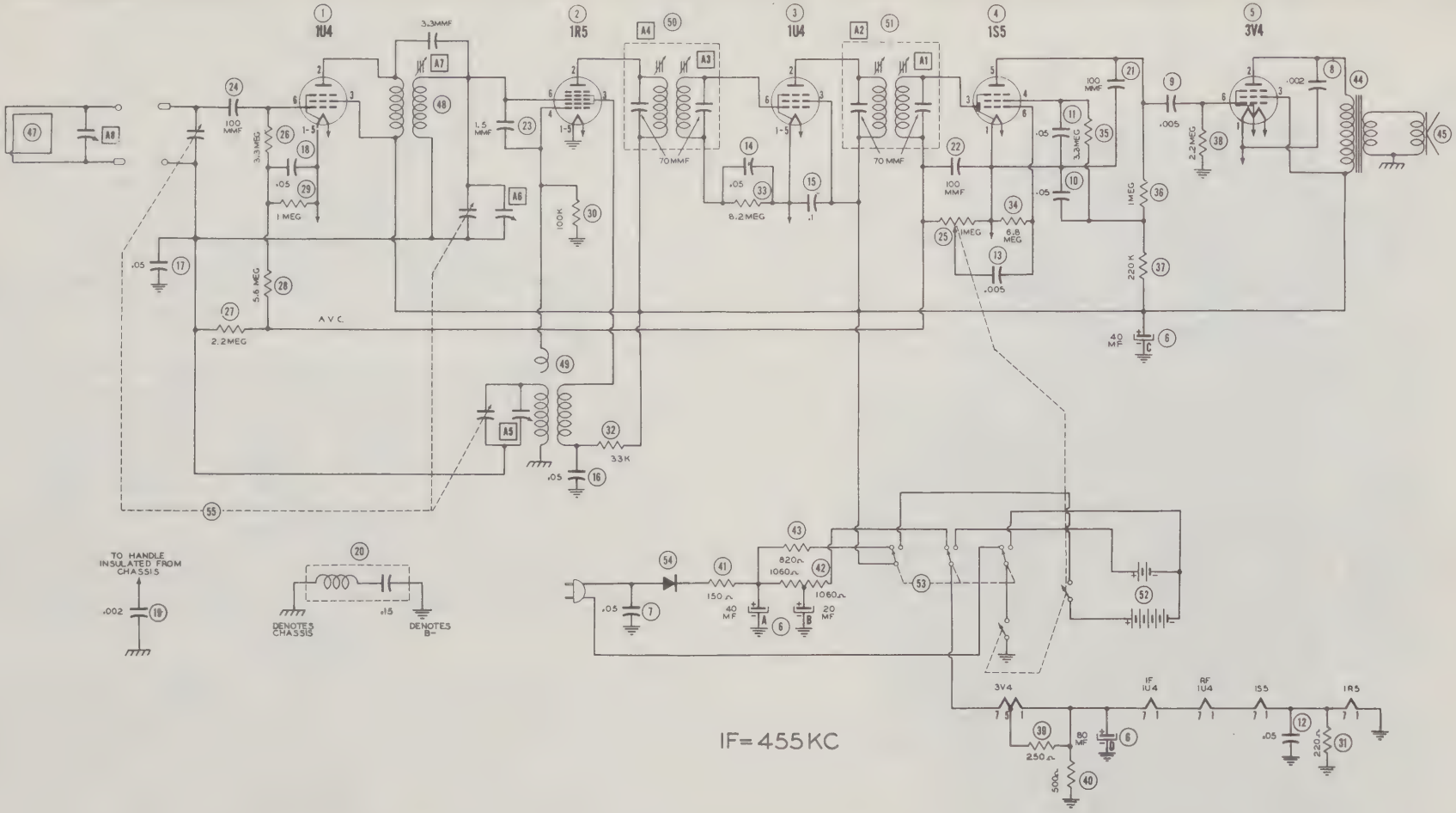
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
53	Switch	40A27114	AC/DC-Batt.
54	Rectifier	48B478111	Selenium
55	3 Gang Var. Cap	19B480125	(35-470MMF, 30-195MMF, 35-470MMF)
A8	Trimmer	20A480185	Ant. Adj.



CHASSIS—BOTTOM VIEW



MOTOROLA MODEL 68L11 (Ch. HS-119)



VOLTAGE READINGS

VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1U4	2.4VDC	.6VDC	95VDC	0V.	2.4VDC	.2VDC	3.6VDC
2	1R5	0V.	95VDC	45VDC	-7VDC§	0V.	0V.	1.2VDC
3	1U4	3.6VDC	.6VDC	95VDC	.4VDC	3.6VDC	0V.	4.4VDC
4	1S5	1.2VDC	0V.	.4VDC	20VDC	.9VDC	0V.	2.4VDC
5	3V4	4.8VDC	90VDC	95VDC	75VDC	6VDC	0V.	0VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1U4	*	3KΩ	3KΩ	INF.	*	4 Meg.	*
2	1R5	0Ω	3KΩ	36KΩ	100KΩ	0Ω	3.5 Meg.	*
3	1U4	*	3KΩ	3KΩ	900KΩ	*	8.2 Meg.	*
4	1S5	*	3.5 Meg.	1 Meg.	3.8 Meg.	1.2 Meg.	6.8 Meg.	*
5	3V4	*	3KΩ	3KΩ	250KΩ	*	2.2 Meg.	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

PHOTOFACT STANDARD NOTATION SCHEMATIC

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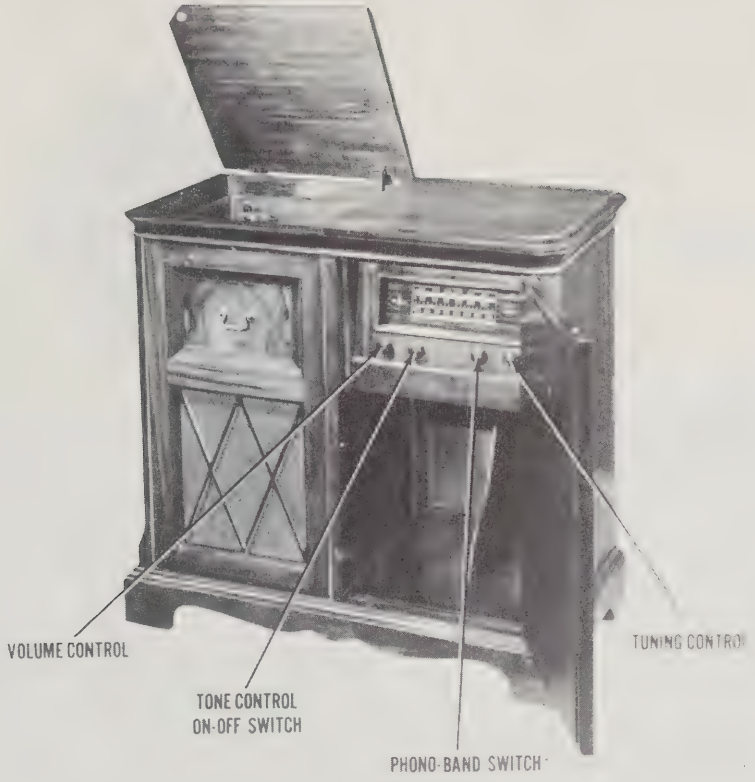
4815-18

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

OLYMPIC MODELS
8-925, 8-934, 8-936



OLYMPIC MODEL 8-934

TRADE NAME	Olympic, Models 8-925, 8-934, 8-936
MANUFACTURER	Olympic Radio & Tele. Corp., 3101-19 38th Ave., Long Island City, N.Y.
TYPE SET	AC Operated Combination Phono-Radio, AM-FM Superheterodyne Receiver with Loop Ant.
TUBES (TEN)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 1st IF Amp., 6BA6 2nd IF Amp., 6AL5 FM Det., 6SQ7 AF Amp., 6SQ7 AM Det.-AVC-Phase Inv., (2) 6K6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC — RATING .92 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535-1700KC — FREQ. MOD. 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to white line at left edge of dial window.
Use insulated alignment screwdriver for all adjustments.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 1 (grid) of 6BA6 2nd IF Tube (4). Low side to chassis.	10.7MC (Unmodulated)	FM (fully counter-clockwise)	Tuning cap. fully open.	DC probe to Point (A). Common to Point (B).	A1	Adjust for maximum deflection.
2	.1 MFD.	"	"	"	"	DC probe to Point (C). Common to Point (B).	A2	Adjust for zero deflection.
3	.1 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	"	"	"	DC probe to Point (A). Common to Point (B).	A3, A4, A5, A6	Adjust for maximum deflection. Continue with AM alignment in Step 4.

FOR REMAINDER OF ALIGNMENT SEE PAGE 8 OF THIS FOLDER.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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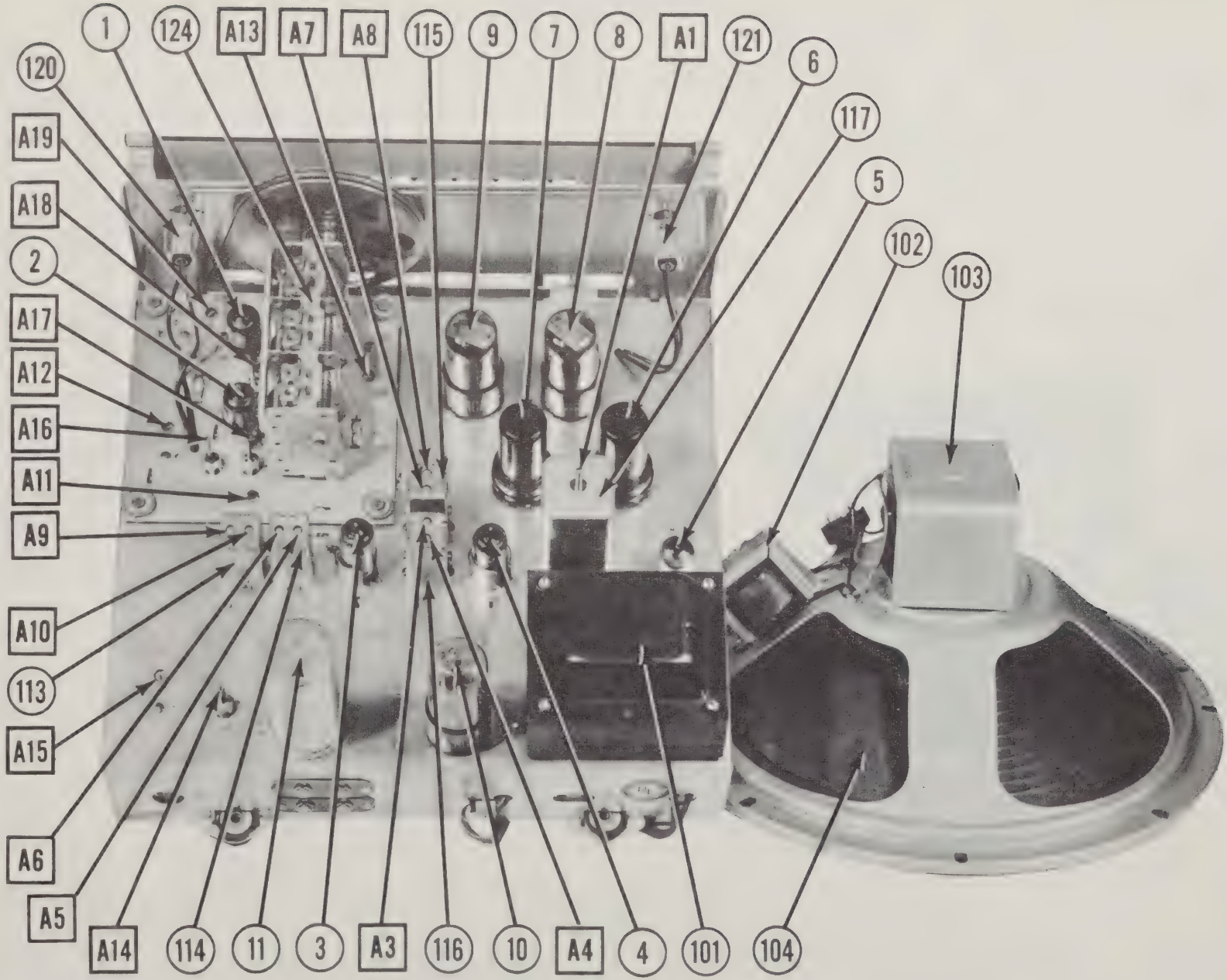
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: OLYMPIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CK	
3	1st IF Amp.	6BA6	6BA6	7BK	
4	2nd IF Amp.	6BA6	6BA6	7BK	
5	FM Det.	6AL5	6AL5	6BT	
6	AF Amp.	6SQ7	6SQ7	8Q	
7	AM Det.-AVC-Phase Inv.	6SQ7	6SQ7	8Q	
8	Power Output	6K6GT	6K6GT	7S	
9	" "	6K6GT	6K6GT	7S	
10	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
11A	30	500	CO-1270	AF862J4A*	UP3345	DY-2x30-450	EL-424*	● Filter
B	20	450						■ "
C	4	450			BR445	M-4-450		▲ Conv. Screen Decoup.
12	4	450	CO-1056	PRS450/4	BR445	M-4-450	UT-4	Stabilizing Cap.
13	.1	600	RCP10W6104A	684-1	DT6P1	ST-6-1	TC-1	RF Bypass Pwr. Supply
14	.05	600	CO-715	684-05	DT6S5	ST-6-05	TC-15	Line Filter
15	.002	600	RCP10W6202M	684-002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
16	.002	600	RCP10W6202M	684-002	DT6D2	ST-6-002	TC-22	" " "
17	.005	600	RCP10W6502A	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
18	.005	600	RCP10W6502A	684-005	DT6D5	ST-6-005	TC-25	" "
19	.005	600	RCP10W6502A	684-005	DT6D5	ST-6-005	TC-25	" "
20	.005	600	RCP10W6502A	684-005	DT6D5	ST-6-005	TC-25	" "
21	.002	600	RCP10W6202M	684-002	DT6D2	ST-6-002	TC-22	Tone Comp.
22	.001	600	RCP10W6102A	684-001	DT6D1	ST-6-001	TC-21	" "
23	.01	600	RCP10W6103A	684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
24	.01	600	RCP10W6103A	684-01	DT6S1	ST-6-01	TC-11	AVC Filter
25	.05	200	RCP10W2503A	684-05	DT6S5	ST-4-05	TC-15	Bias Filter
26	.01	600	RCP10W6103A	684-01	DT6S1	ST-6-01	TC-11	2nd IF Plate Decoup.
27	.01	600	RCP10W6103A	684-01	DT6S1	ST-6-01	TC-11	2nd IF Screen Bypass
28	.01	600	RCP10W6103A	684-01	DT6S1	ST-6-01	TC-11	2nd IF Cathode Bypass
29	.01	500	CO-M-5103	684-01	DT6S1	ST-6-01	TC-11	1st IF Plate Decoup.
30	.01	500	CO-M-5103	684-01	DT6S1	ST-6-01	TC-11	1st IF Screen Bypass
31	.01	600	RCP10W6103A	684-01	DT6S1	ST-6-01	TC-11	AVC Filter
32	.01	600	RCP10W6103A	684-01	DT6S1	ST-6-01	TC-11	" "
33	.1	600	RCP10W6104A	684-.1	DT6P1	ST-6-1	TC-1	Screen Bypass
34	.01	500	CO-M-5103	684-01	DT6S1	ST-6-01	TC-11	Conv. Plate Decoup.
35	.01	600	RCP10W6103A	684-01	DT6S1	ST-6-01	TC-11	Conv. Screen Decoup.
36	100	500	RCM20A101M	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
37	100	500	RCM20A101M	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
38	150	500	RCM20A151K	1468-00015	5W5T15	MO.5-315	1FM-315	Diode Load Cap.
39	150	500	RCM20A151K	1468-00015	5W5T15	MO.5-315	1FM-315	Diode Load Cap.
40	3300	300	CCR-152M	1467-003	1W5D3	MW.5-23	1FM-23	De-emphasis-Cer.
41	100	500	RCM20A101M	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
42	100	500	RCM20A101M	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
43	470	500	RCM20A471M	1468-0005	5W5T5	MO.5-35	1FM-35	Conv. Screen Bypass
44	47	500	RCM20CX470K	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
45	100	500	RCM20A101M	1469-0001	5R5T1	MOS.5-31	MS-31	Fixed Padder
46	15	300	CCA-U150K				MS-415	Fixed Padder-Cer.
47	10	300	CCR-U100K	1468-00001	5W5Q1	MO.5-41	MS-41	Feedback-Cer.
48	330	500	RCM20A331M	1468-0003	5W5T3	MO.5-33	1FM-33	RF Coupling
49	1	300	CO-311					" " -Cer.
50	470	500	RCM20A471M	1468-0005	5W5T5	MO.5-35	1FM-35	RF Plate Decoupling
51	22	500	RCM20A220M	1468-000025	5W5Q25	MO.5-425	MS-425	" " "
52	100	500	RCM20A101M	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling
53	1500	300	CCR-152M	1467-0015	1W5D15	MW.5-215	1FM-215	RF Screen Bypass-Cer.
54	100	500	RCM20A220M	1468-0001	5W5T1	MO.5-31	1FM-31	RF Cathode Bypass
55	330	500	RCM20A331M	1468-0003	5W5T3	MO.5-33	1FM-33	RF Bypass
56	100	500	RCM20A101M	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling
57	4.7	300	CO-1083	1468-000005	5W5V5	MO.5-55	MS-55	FM Ant. Coupling-Cer.

*Omit bypass section.

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
58A	2 Meg.	½	PT-567	D13-139X	AT-115	Volume Control tapped @ 500KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 58A per instructions
59A	3 Meg.	½	PT-568	D13-140	AM-67-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 59A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	IDENTIFICATION CODES
60	1 Meg.	½	REB105M	BTS-1 Meg.	Br.-Blk.-Grn. RF Grid
61	68Ω	½	REB680K		Blue-Gray-Blk. RF Cathode
62	1000Ω	½	REB102M	BTS-1000	Br.-Blk.-Red RF Screen
63	1000Ω	½	REB102M	BTS-1000	Br.-Blk.-Red RF Plate Decoupling
64	5Ω	½			Grn.-Blk.-Gold Parasitic Supp.-See Note
65	1 Meg.	½	REB105M	BTS-1 Meg.	Br.-Blk.-Grn. Conv. Grid
66	22KΩ	½	REB223M	BTS-22K	Red-Red-Or. Osc. Grid
67	22Ω	½	REB220M		Red-Red-Blk. Parasitic Supp.-Note 1
68	1000Ω	½	REB102M	BTS-1000	Br.-Blk.-Red Conv. Screen Decoupling
69	22KΩ	1	REB223M	BTA-22K	Red-Red-Or. Voltage Dropping
70	1000Ω	½	REB102M	BTS-1000	Br.-Blk.-Red Conv. Plate Decoupling
71	100KΩ	½	REB104M	BTS-100K	Br.-Blk.-Yl. AVC Network
72	15KΩ	2	RED153M	BT-2-15K	Br.-Grn.-Or. Voltage Dropping
73	47KΩ	2	RED473M	BT-2-47K	Yl.-Vi.-Or. Bleeder
74	68Ω	½	REB680K		Blue-Gray-Blk. 1st IF Cathode
75	1000Ω	½	REB102M	BTS-1000	Br.-Blk.-Red 1st Plate Decoup.
76	47KΩ	½	REB473M	BTS-47K	Yl.-Vi.-Or. Diode Filter
77	470KΩ	½	REB474M	BTS-470K	Yl.-Vi.-Yl. Diode Load
78	2.2 Meg.	½	REB225M	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
79	68Ω	½	REB680K		Blue-Gray-Blk. 2nd IF Cathode
80	33KΩ	½	REC333K	BTS-33K	Or.-Or.-Or. 2nd IF Screen
81	1000Ω	½	REB102M	BTS-1000	Br.-Blk.-Red 2nd IF Plate Decoup.
82	220Ω	½	REB221M		Red-Red-Br. RF Filter
83	22KΩ	½	REB223M	BTS-22K	Red-Red-Or. De-emphasis
84	10KΩ	½	REB103K	BTS-10K	Br.-Blk.-Or. Ratio Det. Diode Load
85	10KΩ	½	REB103K	BTS-10K	Br.-Blk.-Or. " " " "
86	470KΩ	½	REB474M	BTS-470K	Yl.-Vi.-Yl. AVC Network
87	100KΩ	½	REB104K	BTS-100K	Br.-Blk.-Yl. Delayed AVC Network
88	1.5 Meg.	½	REB155K	BTS-1.5 Meg.	Br.-Grn.-Grn. " " "
89	10 Meg.	½	REB106M	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
90	470KΩ	½	REB474M	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
91	10 Meg.	½	REB106M	BTS-10 Meg.	Br.-Blk.-Blue Phase Inv. Grid
92	470KΩ	½	REB474M	BTS-470K	Yl.-Vi.-Yl. Phase Inv. Plate Load
93	470KΩ	½	REB474M	BTS-470K	Yl.-Vi.-Yl. Output Grid
94	470KΩ	½	REB474M	BTS-470K	Yl.-Vi.-Yl. " "
95	100KΩ	½	REB104M	BTS-100K	Br.-Blk.-Yl. Output Grid
96	390Ω	2	RED391M	BW-2-390	Or.-White-Br. Output Cathode
97	220KΩ	½	REB224M	BTS-220K	Red-Red-Yl. Tone Comp.
98	33KΩ	½	REB334M	BTS-330K	Or.-Or.-Yl. Phono Shunt
99	220KΩ	½	REB224M	BTS-220K	Red-Red-Yl. Phono Shunt
100	470Ω	2	RED471M	BT-2-470	Yl.-Vi.-Br. Voltage Dropping

Note-Some models use two 10Ω 1/2 Watt (Part #REB100M) in this application.
Note 1-Wind two turns of #20 bare wire around resistor and connect in parallel with resistor per original.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: OLYMPIC PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
101	117V AC @ .92A	720V CT .118A DC	5.1V AC @ 2.0A	6.4V AC @ 3.2A	TR-1052	P-6013	T22R05	P-2953

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		OLYMPIC PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
102	7000Ω CT	3.8Ω	540Ω CT	.4Ω	Part of SK-384	A-3823	T22S47#	A-2901	#Use mounting slots provided.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			OLYMPIC PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD RES.	VC IMP.				
103	650Ω	3.8Ω	SK-384			
	CONE DIA.	VC DIA.				
104	11½"	1"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	OLYMPIC PART No.	MEISSNER PART No.
105	BC Loop Ant.		.1Ω		
106	FM Dipole "		.2Ω		
107	BC Ant.Load Coil		2.8Ω	CL-1278	
108	FM Ant.Coil		0Ω	CL-1269	
109	BC RF Coil	60Ω	3.8Ω	CL-1026	14-1057
110	FM " "		.1Ω	CL-1032	
111	BC Osc.Coil	.6Ω	5.3Ω	CL-1025	14-1060
112	FM " "		.1Ω	CL-1033	
113	AM 1st IF	7.8Ω	7.8Ω	TR-1048	
114	FM 1st IF	2Ω	2Ω	TR-1047	
115	AM 2nd IF	8.1Ω	8Ω	TR-1049	
116	FM 2nd IF	2Ω	2Ω	TR-1050	
117	Ratio Det. Trans.	1Ω	.1Ω	TR-1051-1	
118	RF Plate Choke		1Ω	CK-1057	
119	RF Filament Choke		0Ω	CK-1058	
125	RF Fil.Choke		0Ω	CK-1058	

DIAL LIGHT

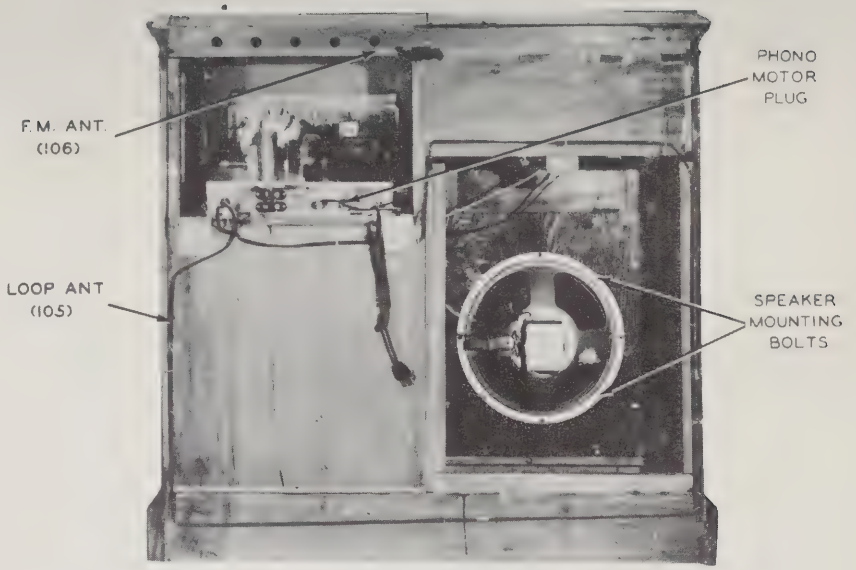
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					OLYMPIC PART No.		
120	Bayonet	6-8	0.15	Brown			Type 47
121	"	6-8	0.15	"			" "

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	OLYMPIC PART No.	ASTATIC PART No.	
122		L-70-A	L-70 original part.

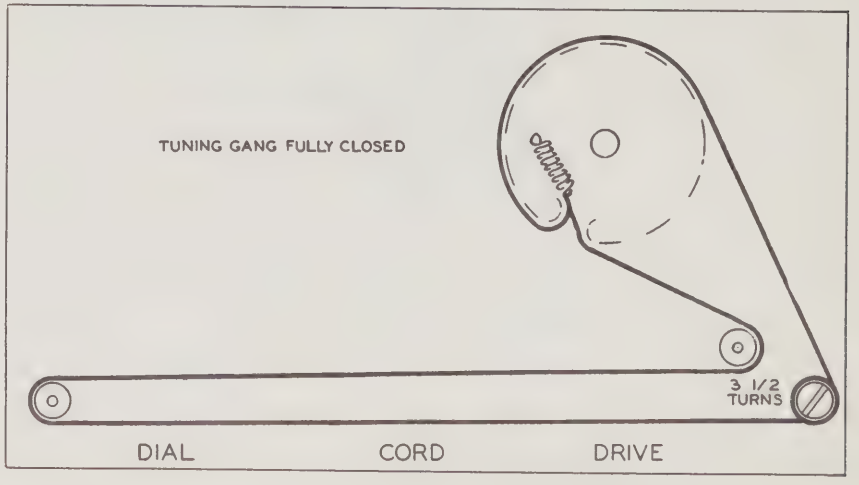
MISCELLANEOUS

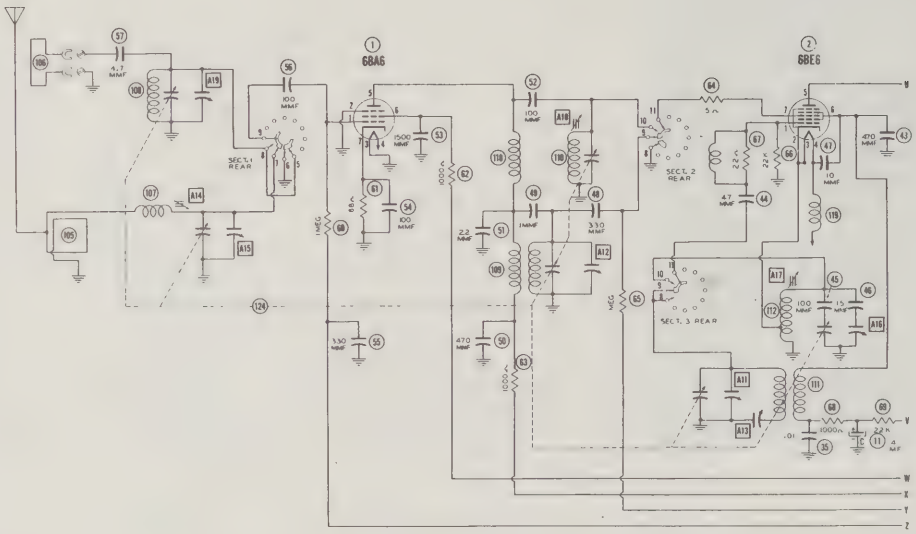
ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
123	Switch	SW-843	Band-Phono
124	3 Gang Var. Cap.	CV-1053	(14-512 MMF) each section
	Dial Scale	DL-1070-1	Glass
	Dial Pointer	PO-1011	



DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove loop antenna plug from rear of chassis.
3. Remove FM dipole leads from rear of chassis.
4. Remove phono-motor plug from rear of chassis.
5. Remove phono-pickup plug from left hand side of chassis.
6. Remove four machine screws holding chassis in cabinet. Remove chassis from cabinet.
7. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.





IF=455 KC AM

IF=10.7 MC FM

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	-.1VDC	0V.	0V.	6.4VAC	265VDC	95VDC	-.9VDC	-
2A	6BE6	-6.5VDC	0V	0V.	6.4VAC	265VDC	110VDC	-.4VDC	
2B	6BE6	+7VDC	0V.	0V.	6.4VAC	260VDC	95VDC	0V.	-
3	6BA6	-.5VDC	0V.	0V.	6.4VAC	255VDC	100VDC	-.9VDC	-
4	6BA6	0V.	0V.	0V.	6.4VAC	240VDC	107VDC	1.2VDC	-
5	6AL5	7.1VDC	1.1VDC	0V.	6.4VAC	15VDC	12VDC	7VDC	-
6	6BQ7	0V.	-.4VDC	0V.	-.1VDC	0V.	97VDC	6.4VAC	0V.
7	6BQ7	0V.	-.5VDC	0V.	-.4VDC	-.4VDC	90VDC	6.4VAC	0V.
8	6BQ6T	0V.	6.4VAC	255VDC	340VDC	0V.	280VDC	0V.	23VDC
9	6BQ6T	0V.	6.4VAC	255VDC	300VDC	0V.	0V.	0V.	25VDC
10	5T30T	0V.	340VDC	0V.	360VAC	0V.	360VAC	0V.	340VDC

TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6BA6	3.7 Meg.	0Ω	0Ω	.1Ω	5MΩ	31KΩ	6ΩΩ	-	
2A	6BE6	220Ω	0Ω	0Ω	.1Ω	50KΩ	75KΩ	3.7 Meg.	-	
2B	6BE6	220Ω	0Ω	0Ω	.1Ω	50KΩ	75KΩ	5Ω	-	
3	6BA6	2.8 Meg.	0Ω	0Ω	.1Ω	50KΩ	30KΩ	6ΩΩ	-	
4	6BA6	8Ω	0Ω	0Ω	.1Ω	50KΩ	65KΩ	6ΩΩ	-	
5	6AL5	INF.	INF	0Ω	.1Ω	65KΩ	75KΩ	85KΩ		
6	6BQ7	0Ω	10 Meg.	0Ω	360KΩ	0Ω	520KΩ	.1Ω	0Ω	
7	6BQ7	0Ω	10 Meg.	0Ω	2.7 Meg.	520KΩ	520KΩ	.1Ω	1Ω	
8	6BQ6T	3 Meg.	.1Ω	50KΩ	50KΩ	570KΩ	50KΩ	0Ω	35ΩΩ	
9	6BQ6T	INF.	.1Ω	50KΩ	50KΩ	570KΩ	100KΩ	0Ω	30ΩΩ	
10	5T30T	INF.	50KΩ	INF.	90Ω	1MΩ	97Ω	INF.	50KΩ	

VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

STAGE GAIN MEASUREMENTS

ANTENNA TO RF GRID	15X		600KC
RF GRID TO CONVERTER GRID	10X		600KC
CONVERTER GAIN	40X	IN	600KC
		OUT	455KC
INPUT IF TRANS.	.85X		455KC
IF TUBE	220X		455KC
OUTPUT IF TRANS.	.7X		455KC
AUDIO	55X		400 ∿
OUTPUT	14X		400 ∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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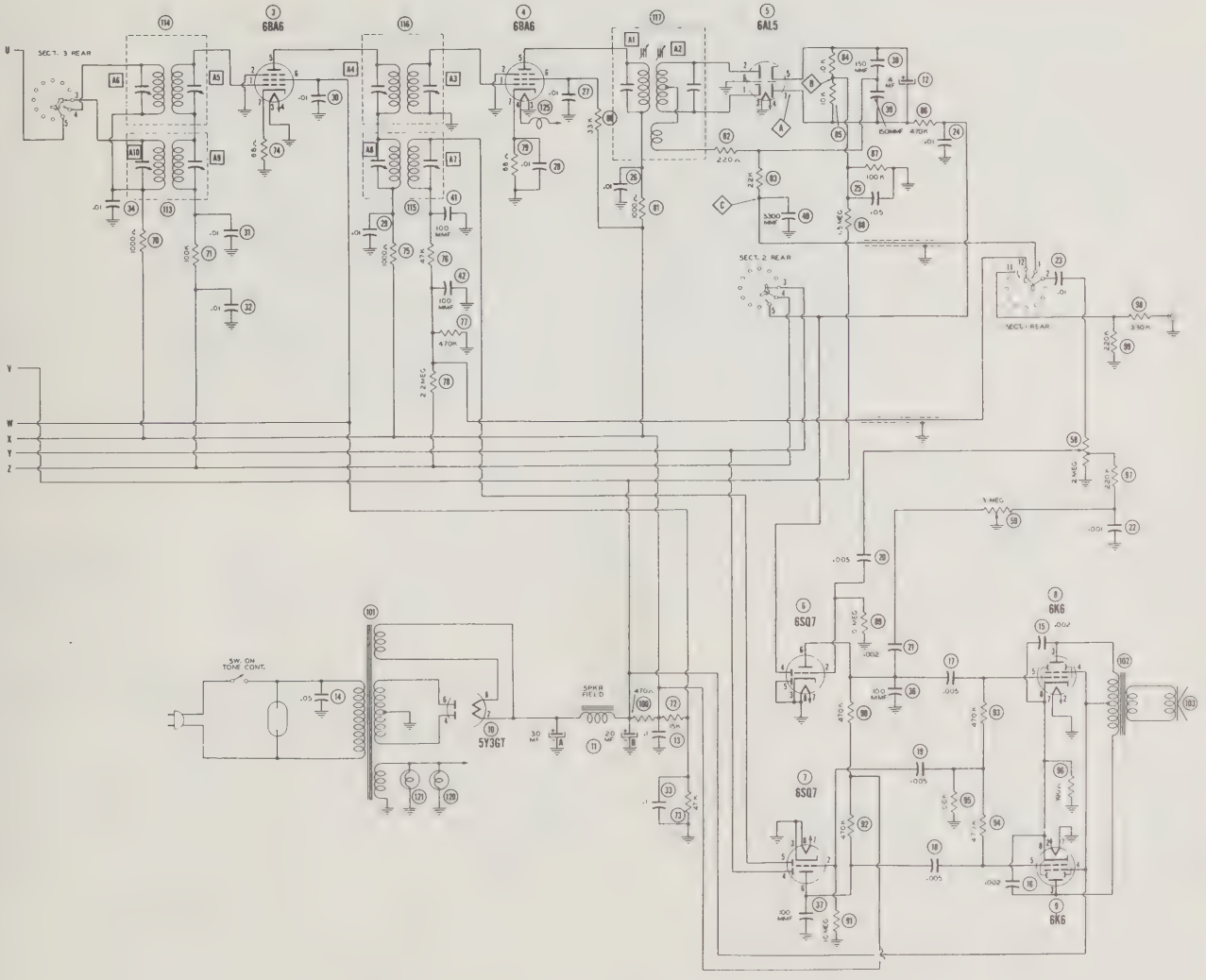

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4815-19

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (3). Low side to chassis.	10.7MC (Freq. Mod.)	FM	Tuning cap. fully open.	Vertical input to Point (A). Ground to Point (B).	A1,A3, A4	Disconnect 4 MFD cap. from Point (A). Adjust for maximum amplitude, Symmetry and coincidence of pattern per Fig. 1.
2	.01 MFD	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	"	"	"	"	A5,A6	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
3	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (3). Low side to chassis.	"	"	"	Vertical input to Point (C). Ground to Point (B).	A2	Reconnect 4 MFD cap. to Point (A). Adjust for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with AM Alignment in Step 4.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
4	.1 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	455KC	BC (Center Position)	Tuning cap. fully open.	Across voice coil	A7,A8, A9,A10	Adjust for maximum output.
5	.1 MFD.	High side to front AM stator of tuning cap. Low side to chassis.	1700KC	"	1700KC	"	A11	" " " "
6	.1 MFD.	"	1500KC	"	Tune for maximum output.	"	A12	" " " "
7	.1 MFD.	"	600KC	"	"	"	A13	Rock tuning cap. and adjust for maximum output. Repeat Steps 5, 6 & 7 until no further improvement can be made.
8		Loop (Loop ant. of receiver must be connected).	"	"	"	"	A14	Fashion loop of several turns of wire and radiate signal into loop of receiver. Rock tuning cap. and adjust A14 for maximum output.
9		"	1500KC	"	"	"	A15	Adjust for maximum output. Repeat Steps 8 & 9 until no further improvement can be made. Continue with either type of FM RF Alignment depending on equipment available.

FM RF ALIGNMENT USING FM SIGNAL GENERATOR AND OUTPUT METER

Use freq. modulated signal with 30% 400 ∿ modulation.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
10	300Ω carbon res.	High side to ungrounded FM ant. terminal. Low side to chassis.	108MC (Freq. Mod.)	FM	108MC	Across voice coil	A16	Adjust for maximum output.
11	"	"	88MC (Freq. Mod.)	"	88MC	"	A17	Adjust for maximum output. Check for image by tuning sig. gen. to 109.4MC. If signal is not heard retune sig. gen. to 88MC and turn A17 out until next peak is obtained. Adjust A17 for maximum output and recheck for image. Repeat Steps 10-11 until no further improvement can be made.
12	"	"	102MC	"	Tune for maximum output.	"	A18	Adjust for maximum output.
13	"	"	106MC	"	"	"	A19	" " " "

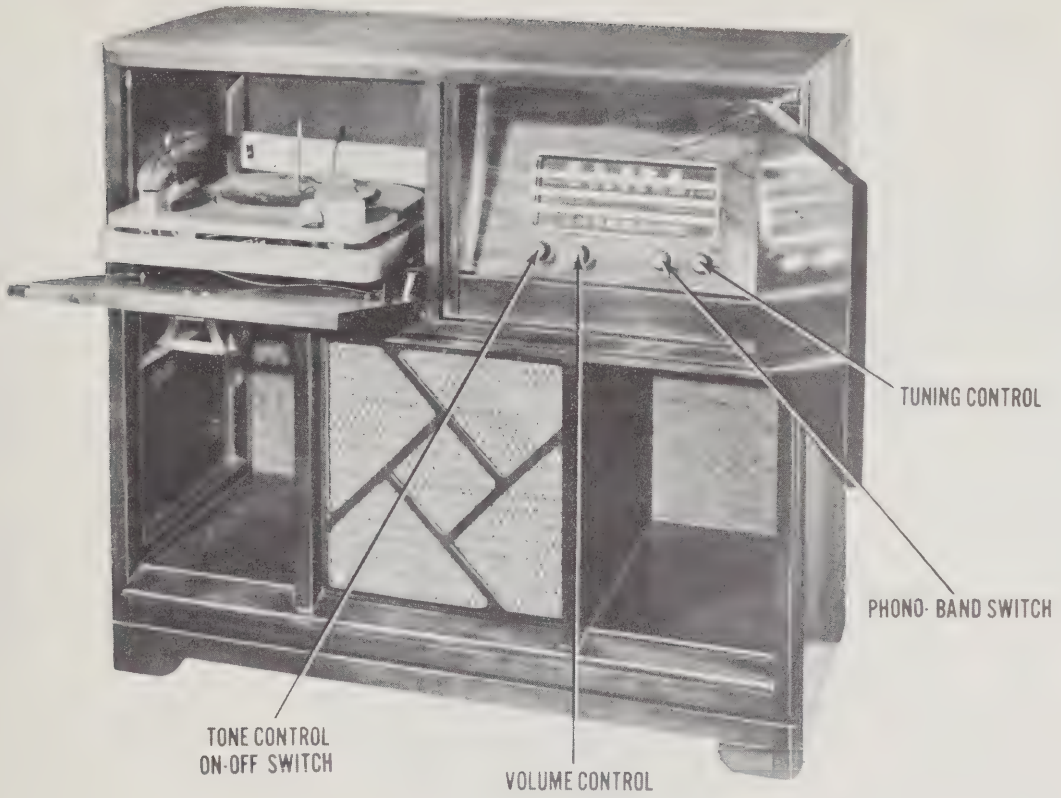
FM RF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
10	300Ω carbon res.	High side to ungrounded FM ant. terminal. Low side to chassis.	108MC (Unmodulated)	FM	108MC	DC probe to Point (A). Common to Point (B).	A16	Adjust for maximum deflection.
11	"	"	88MC	"	88MC	"	A17	Adjust for maximum deflection. Tune sig. gen. to 109.4MC. If deflection is not obtained on meter retune sig. gen. to 88MC and turn A17 out until next peak is obtained. Adjust for maximum deflection and recheck for image. Repeat Steps 10 & 11 until no further improvement can be made.
12	"	"	102MC	"	Tune for maximum deflection.	"	A18	Adjust for maximum deflection.
13	"	"	108MC	"	"	"	A19	" " " "

FIG. 1

FIG. 2

FOR ALTERNATE IF FM ALIGNMENT SEE FRONT PAGE OF THIS FOLDER.



PHILCO MODEL 48-1284

TRADE NAME	Philco, Model 48-1284
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC Operated Combination Phono-Radio 2 Band Superheterodyne Receiver with Loop Ant.
TUBES (SEVEN)	Types, 7AF7 Converter, 7A7 1st IF Amp., 7R7 2nd IF Amp.-Det.-AVC, 7F7 AF-Phase Inv., (2) 6K6GT Power Output, 7Z4 Rectifier.
POWER SUPPLY	105-120 Volts AC — RATING .62 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1650KC — **SHORT WAVE** 9.3-15.7MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to ant. terminal (NO. 1) on back of receiver. Low side to chassis.	455KC	BC	Tuning cap. fully closed	Across voice coil (Terminals 2 & 3 of ant. terminal strip)	A1,A2, A3,A4, A5,A6	Adjust for maximum output. Reassemble receiver in the cabinet.
2		Loop	580KC	"	580KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1600KC	"	1600KC	"	A8	Adjust for maximum output
4		"	1500KC	"	Tune for maximum output.	"	A9	" " " "
5		"	580KC	"	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 3, 4 and 5 until no further improvement can be made.
6		"	15MC	SW	15MC	"	A10	Adjust for maximum output Tune sig. gen. to 15.9MC. If signal is not heard retune sig. gen. to 15MC and open A10 to next peak. Adjust for maximum output and check for image.
7		"	"	"	Tune for maximum output.	"	A11	Rock tuning cap. and adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	7AF7	7AF7	8AC	
2	1st IF Amp.	7A7	7A7	8V	
3	2nd IF Amp. & Det.-AVC	7R7	7R7	8AE	
4	AF & Phase Inv.	7F7	7F7	8AC	
5	Power Output	6K6GT	6K6GT	7S	
6	" "	6K6GT	6K6GT	7S	
7	Rectifier	7Z4	7Z4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8	35	450	30-2570-25	AF8J	UP4045	DY-40-450	EL-4	Filter
9A	10	450	30-2570-24	AF444J*	UP4245	DY-3x20-450*	EL-424†	▲ "
B	40	450						"
10	.01	600	61-0120	684-.01	DT6S1	MPH-6-01	TC-11	Line Filter
11	.01	600	61-0120	684-.01	DT6S1	MPH-6-01	TC-11	" "
12	.006	1000	61-0153	1084-.006	MD16D6	STM-16-006	TR-26	Output Plate Bypass
13	.006	1000	61-0153	1084-.006	MD16D6	STM-16-006	TR-26	" " "
14	.1	200	61-0113	464-.1	DT2P1	ST-2-1	TC-1	Bias Filter
15	.006	400	45-3500-7	484-.006	DT6D6	ST-6-006	TC-26	Audio Coupling
16	.006	400	45-3500-7	484-.006	DT6D6	ST-6-006	TC-26	" "
17	.01	400	61-0120	484-.01	DT4S1	ST-4-01	TC-11	Tone Compensation
18	.006	400	45-3500-7	484-.006	DT6D6	ST-6-006	TC-26	" "
19	.006	400	45-3500-7	484-.006	DT6D6	ST-6-006	TC-26	Audio Coupling
20	.006	400	45-3500-7	484-.006	DT6D6	ST-6-006	TC-26	" "
21	.05	400	61-0122	464-.05	DT4S5	ST-4-05	TC-15	2nd IF Plate Decoup.
22	.01	400	61-0120	484-.01	DT4S1	ST-4-01	TC-11	RF Bypass Power Supply
23	.01	400	61-0120	484-.01	DT4S1	ST-4-01	TC-11	AVC Filter
24	.01	400	61-0120	484-.01	DT4S1	ST-4-01	TC-11	2nd IF Screen Bypass
25	.05	400	61-0122	484-.05	DT4S5	ST-4-05	TC-15	2nd IF Cathode Bypass
26	.01	400	61-0120	484-.01	DT4S1	ST-4-01	TC-11	1st IF Screen Bypass
27	.01	600		684-.01	DT6S1	ST-6-01	TC-11	Conv. Plate Decoup.
28	.01	400	61-0120	484-.01	DT4S1	ST-4-01	TC-11	Conv. Cathode Bypass
29	.01	400	61-0120	484-.01	DT4S1	ST-4-01	TC-11	AVC Filter
30	.006	400	45-3500-7	484-.006	DT6D6	ST-6-006	TC-26	Audio Coupling
31	100	300	60-10105407	1468-.0001	5W5T1	MO.5-31	1FM-31	1st AF Plate Bypass-Cer.
32	100	300	62-110009001	1468-.0001	5W5T1	MO.5-31	1FM-31	IF Coupling-Cer.
33	100	300	62-110009001	1468-.0001	5W5T1	MO.5-31	1FM-31	Diode Filter
34	240	500	60-10245307	1468-.00025	5W5T25	MO.5-325	1FM-325	RF Coupling
35	4700	500	60-20515304					Fixed Padder
36	250	300		1469-.00025	5R5T25	MOS.5-325	MS-325	Osc. Coupling-Cer.
37	250	300		1469-.00025	5R5T25	MOS.5-325	MS-325	Osc. Grid Cap.-Cer.
38	12	300	30-1224-33					Osc. Coupling-Cer.
39	100	500	60-10105407	1468-.0001	5W5T1	MO.5-31	1FM-31	Tone Compensation-Cer.
40	100	300	62-110009001	1468-.0001	5W5T1	MO.5-31	1FM-31	Conv. Plate Bypass-Cer.

*Parallel sections to obtain desired capacity.
†Omit two sections.

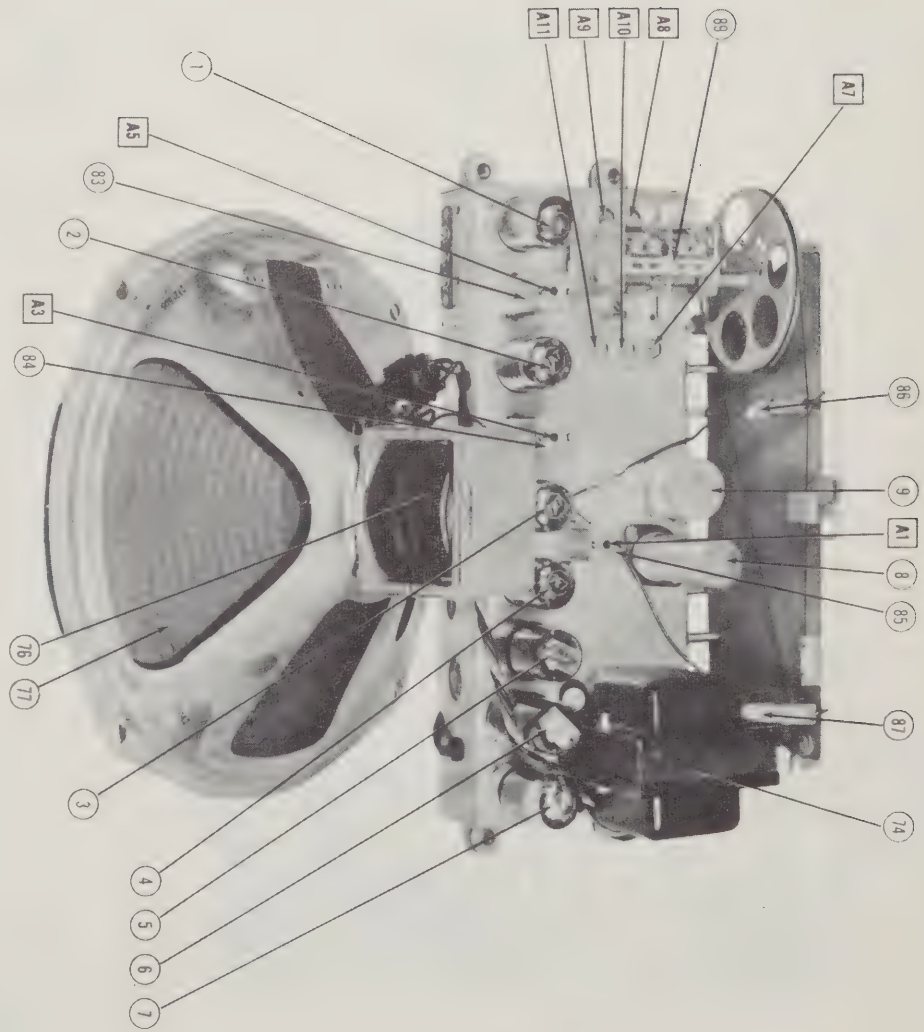
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
41A	2 Meg.	½	33-5535-16	D18-139X	T-116	Volume Control tapped @ 1 Meg.
B	Shaft		Not Req.	A	Not Req.	Attach to 41A per instructions
42	4 Meg.	½	33-5538-29			Tone Control & Sw.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
43	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Conv. Grid
44	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Conv. Plate Decoup.
45	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red Conv. Cathode
46	15K	½	66-3153340	BTS-15K	Br.-Grn.-Or. Osc. Grid

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
47	1.5K	½	66-5153340	BTS-15K	Br.-Grn.-Or. Osc. Plate Load
48	33KΩ	½	66-5333340	BTS-33K	Or.-Or.-Or. Osc. Plate Load
49	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
50	47KΩ	½	66-5473340	BTS-47K	Yl.-Vi.-Or. 1st IF Screen
51	180Ω	½	66-1183340		Br.-Gray-Br. 1st IF Cathode
52	3.3 Meg.	½	66-5333340	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
53	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. " "
54	180Ω	½	66-1183340		Br.-Gray-Br. 2nd IF Cathode
55	68KΩ	½	66-3683340	BTS-68K	Blue-Gray-Blk. 2nd IF Screen
56	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red 2nd IF Plate Decoup.
57	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Diode Filter
58	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. Diode Load
59	33KΩ	½	66-3333340	BTS-33K	Or.-Or.-Or. Tone Comp.
60	10 Meg.	½	66-5103340	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
61	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. AF Plate Load
62	56KΩ	½	66-3563340	BTS-56K	Grn.-Blue-Or. Phase Inv. Plate Load
63	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Phase Inv. Grid
64	4700Ω	½	66-2473340	BTS-4700	Yl.-Vi.-Red Ph. Inv. Cathode
65	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Ph. Inv. Cathode
66	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. Output Grid
67	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. " "
68	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Bias
69	165Ω	5	33-1334-3	AB-150	Br.-Blue-Grn. "
70	68Ω	½	*66-0683340	BW-½-68	Blue-Gray-Blk. Feedback
71	4.7Ω	½	66-9474350	BW-½-4.7	Yl.-Vi.-Gold Feedback
72	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Phono Shunt
73	15KΩ	2	66-3153340	BT-2-15K	Br.-Grn.-Or. Voltage Dropping

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	PHILCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
74	117V AC @ .82A	620V CT @ .093A DC	6.5V AC @ 3.2A		32-8350	P-6312**	T22R32‡	

**Mount vertically with universal mounting brackets.
‡Drill new mounting holes and add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
75	8200Ω CT	3.7Ω	580Ω CT	.5Ω	32-8274	A-3824	T22S56	A-2936§	$Drill one new mounting hole.

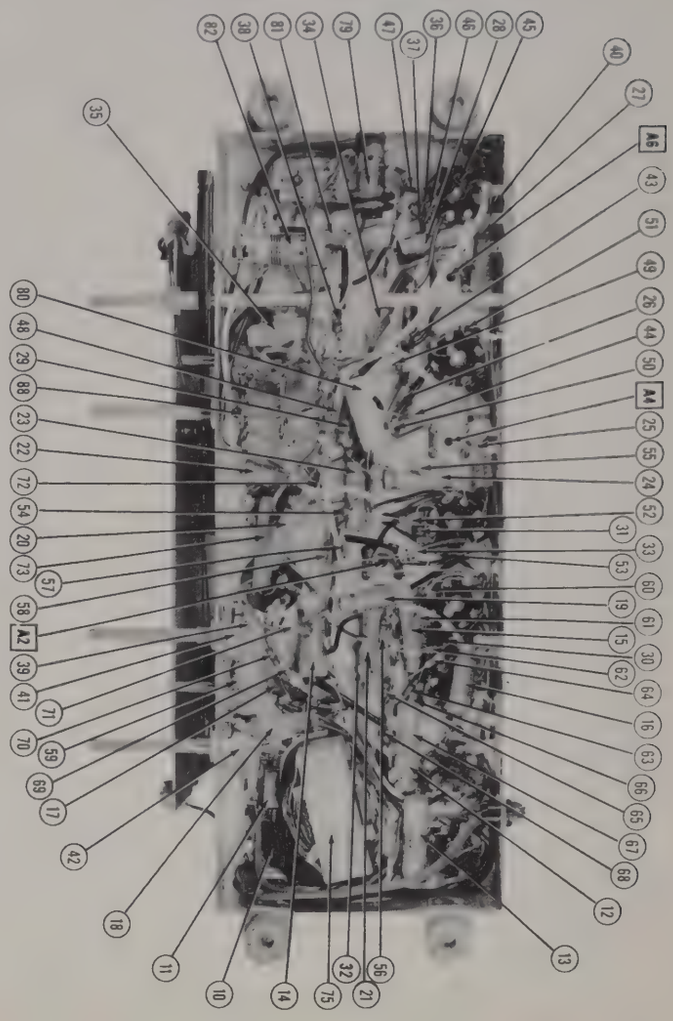
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD RES.	VC IMP.	PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
76	650Ω	3.7Ω	36-1611-3		12S60#	#Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	VC DIA.				
77	11"	3/4"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	
78	Loop Ant.		0Ω	76-3583-1		
79	BC Ant.Coil		1.2Ω	32-4033-7		
80	SW " "		0Ω	32-4050-10		
81	BC Osc. "		10Ω	32-4221-2	14-1060	
82	SW Osc. "		.1Ω	32-4280		
83	1st IF	7Ω	15.7Ω	15.2Ω	32-4258	Primary comprises two windings.
84	2nd IF	7.6Ω		7.8Ω	32-4160-3	16-6678
85	3rd IF	12.6Ω		13Ω	32-4240-2	16-6670

CHASSIS—BOTTOM VIEW



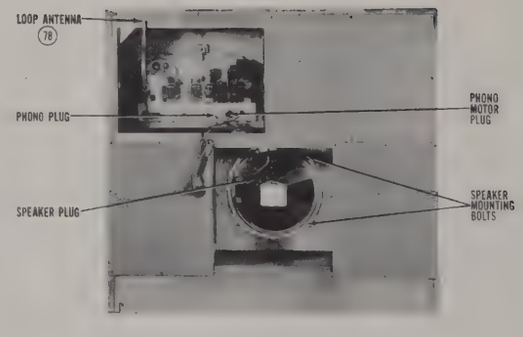
PARTS LIST AND DESCRIPTIONS (Continued)

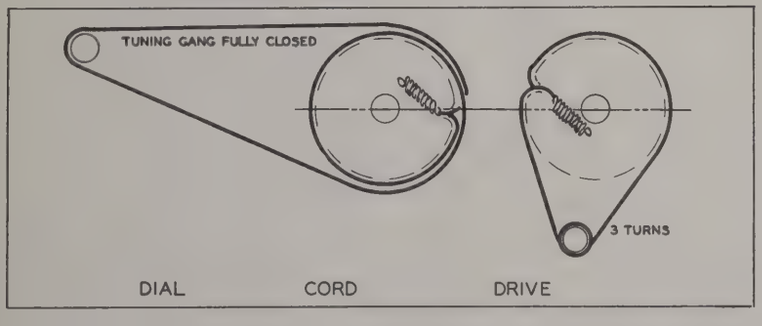
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					PHILCO PART No.		
86	Bayonet	6-8	0.25	Blue	34-2040		Type #44
87	"	6-8	0.25	"	34-2040		" "

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
88	Switch	42-1846	Band-Phono
89	2 Gang Var. Cap	31-2728	(10-515MMF) each section
A7	Trimmer Strip	31-6477-10	BC Osc. Adj.
A10			SW " "
A11			SW Ant. Adj.
A8	" "	31-6476-16	BC Osc. Adj.
A9			BC Ant. Adj.
	Cabinet	10705	
	Dial Scale	76-3187-5	
	Dial Pointer	56-3179	

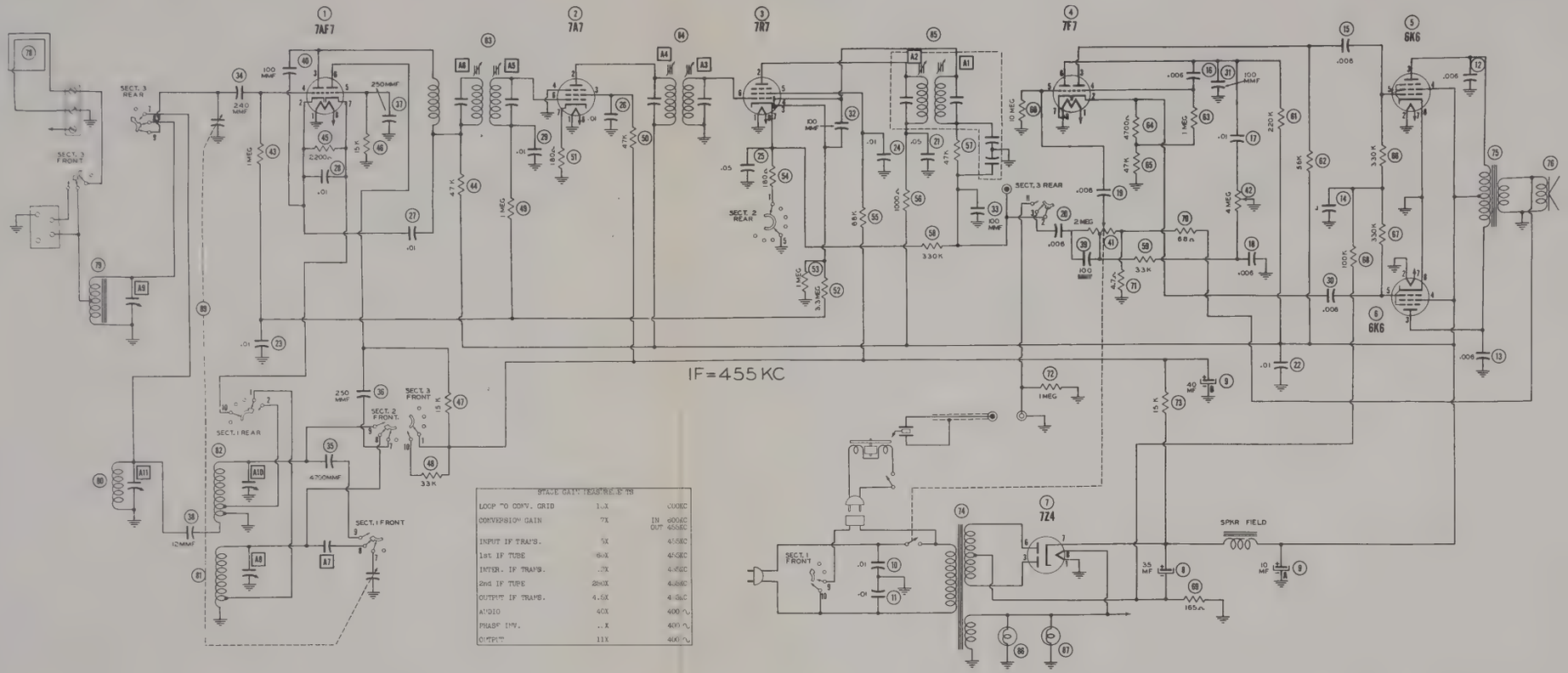




DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove loop antenna leads from terminal strip at rear of chassis.
3. Remove phono-pickup plug from chassis.
4. Remove phono-motor plug from chassis.
5. Remove speaker plug from speaker.
6. Remove one Phillips head wood screw holding dial backplate assembly secure in cabinet.
7. Remove four machine screws holding chassis in cabinet. Remove chassis from cabinet.
8. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

DATE 9/48-#4315-20 SET #45-FOLDER #20



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7AF7	0V.	17VDC	150VDC	-.6VDC	-2.6VDC§	86V.C	0V.	6.3VAC
2	7A7	0V.	250VDC	180VDC	0V.	0V.	0V.	.6VDC	6.3VAC
3	7R7	0V.	250VDC	0V.	-.3VDC	100VDC	0V.	1.2VDC	6.3VAC
4	7F7	6.3VAC	250VDC	210VDC	.7VDC	-.5VDC	60VDC	0V.	6V.
5	6K6GT	0V.	0V.	250VDC	250VDC	-6VDC	0V.	6.3VAC	0V.
6	6K6GT	0V.	0V.	250VDC	250VDC	-6.2VDC	0V.	6.3VAC	0V.
7	7Z4	0V.	0V.	310VDC	0V.	0V.	310VDC	325VAC	6.3VAC

§TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7AF7	0Ω	2.2KΩ	160KΩ	5 Meg.	15 Me.	160KΩ	.12	.1Ω
2	7A7	0Ω	120KΩ	180KΩ	0Ω	0Ω	5 Meg.	180Ω	.12
3	7R7	0Ω	120KΩ	1 Meg.	300KΩ	200KΩ	7.5Ω	180Ω	.12
4	7F7	.12	52KΩ	1.0KΩ	1 Meg.	10 Meg.	340KΩ	0Ω	0Ω
5	6K6GT	0Ω	0Ω	1.0KΩ	1.0KΩ	430KΩ	INF.	.12	0Ω
6	6K6GT	0Ω	0Ω	1.0KΩ	1.0KΩ	430KΩ	INF.	.12	0Ω
7	7Z4	0Ω	I F.	250Ω	INF.	INF.	275Ω	120KΩ	.12

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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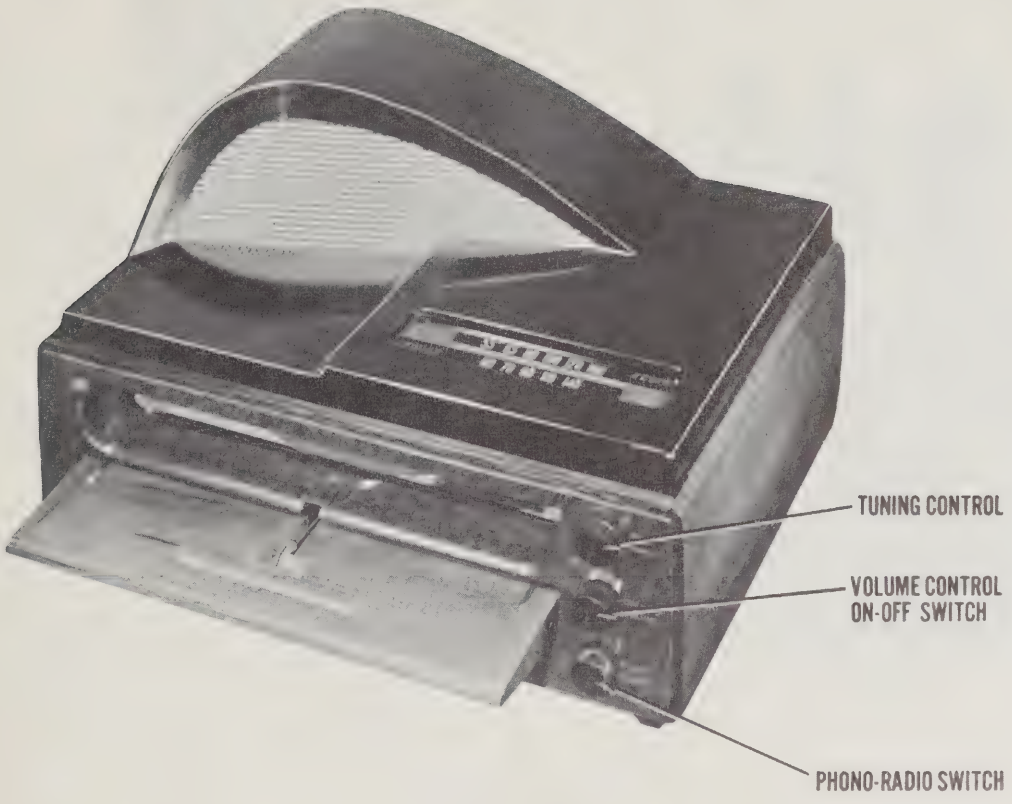

PHILCO MODEL
49-1401

PHILCO MODEL
49-1401

PHILCO MODEL 49-1401

TRADE NAME	Philco, Model 49-1401
MANUFACTURER.	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12BE6 Converter, 12BA6 IF Amp., 6AQ6 Det.-AVC-AF, 35L6GT Power Output, 50Y6GT Rectifier.
POWER SUPPLY	105-120 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .38 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning cap. fully closed and set pointer 2½" from left edge of dial backplate. This is the calibration mark referred to in Steps below.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to external antenna lead. Low side to B-.	455KC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1600KC	3-1/8" from calibration mark.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output.

DISASSEMBLY INSTRUCTIONS

1. Remove two Phillips head wood screws from rear of cabinet holding plastic top on cabinet. Unsolder leads from speaker and remove top from cabinet.
2. Remove two hex head screws from back of front top rail.
3. Remove two machine screws holding front top rail in cabinet. Remove rail from cabinet.
4. Remove four hex head screws from bottom of cabinet holding record player and chassis in cabinet. Remove record player and chassis out front of cabinet.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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DATE 9/48-#4815-21 SET #45-FOLDER #21

PARTS LIST AND DESCRIPTIONS

PHILCO MODEL 49-1401

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	6AQ6	6AQ6	7BT	
4	Power Output	35L6GT	35L6GT	7AC	
5	Rectifier	50Y6GT	50Y6GT	7Q	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6	20	200	30-2568-22	AF4F	UP2025	DY-20-350	EL-12	Voltage Doubler
7A	75	250	30-2575-20			DSB-2x40-250		Filter-Orange
B	20	250				M-16-250		" -Red
8	.05	600	61-0170	684-.05	DT6S5	ST-6-05	TC-15	Line Filter
9	.1	400	61-0113	484-.1	DT4P1	ST-4-1	72P2	Line Isolation
10	.02	400	61-0108	484-.02	DT4S2	ST-4-02	TC-12	Output Plate Bypass
11	.01	400	61-0120	484-.01	DT4S1	ST-4-01	TC-11	Audio Coup.
12	.01	400	61-0120	484-.01	DT4S1	ST-4-01	TC-11	" "
13	.01	400	61-0120	484-.01	DT4S1	ST-4-01	TC-11	IF Screen Bypass
14	.003	400	61-0109	484-.003	DT6D3	ST-6-003	TC-23	IF Plate Decoupling
15	.05	200	61-0122	484-.05	DT2S5	ST-4-05	TC-15	AVC Bypass
16	.03	400	45-3500-1	484-.03	DT4S3	ST-6-03	TC-13	AVC Bypass
17	.01	400	61-0120	484-.01	DT4S1	ST-4-01	TC-11	Phono Isolation
18	5	500	60-90505007	1468-.000005	5R5V5	MOS.5-55	MS-55	Ant. Coupling
19	56	500	60-00515307	1468-.00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
20	10	300	30-1224-26	1469-.00001	5R5Q1	MOS.5-41	MS-41	Fixed Trimmer-Cer.
21	220	300	62-122001001	1468-.0002	5W5T2	MO.5-32	1FM-32	Output Grid Bypass

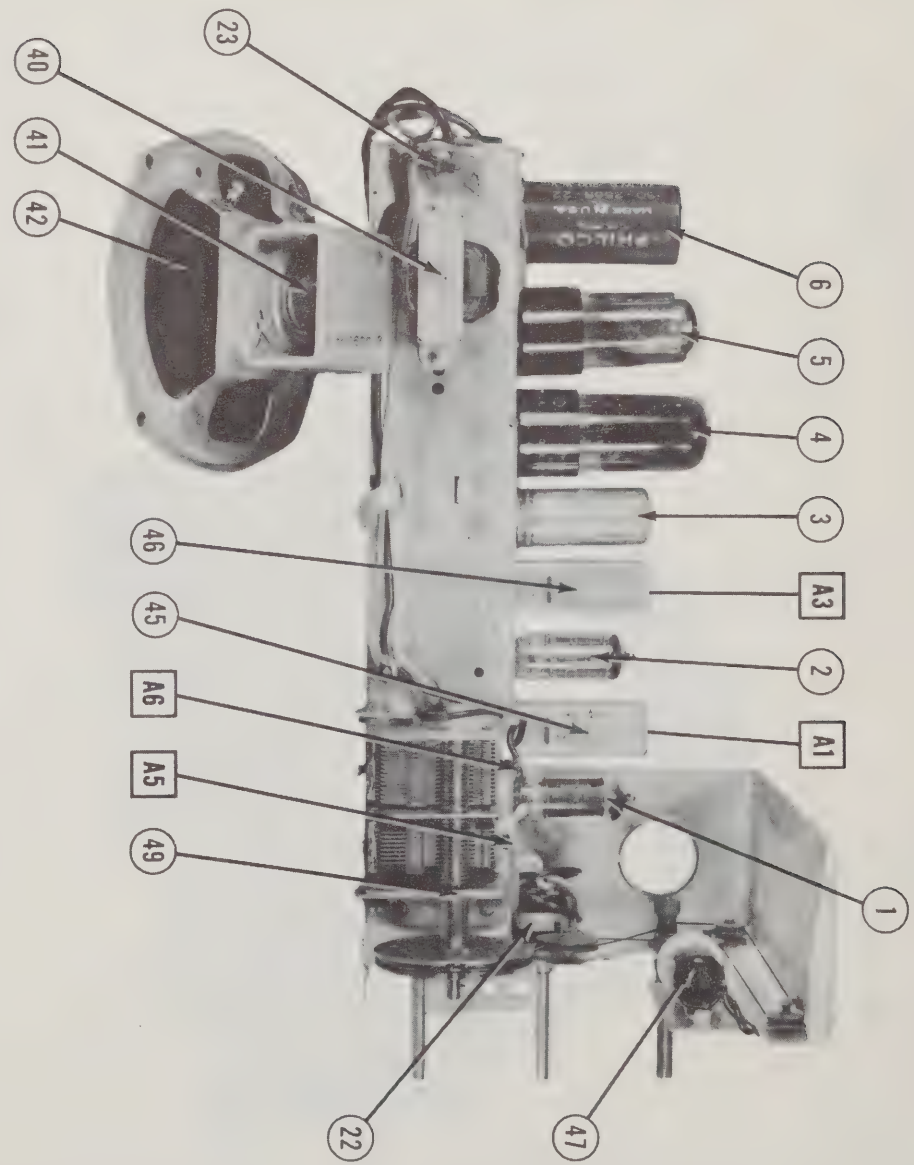
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
22A	500KΩ	½	33-5538-30	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 20A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
23	150KΩ	½	66-4103340	BTS-150K	Br.-Grn.-Yl. Ext. Ant. Loading
24	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Oscillator Grid
25	10Ω	½	66-0103340	BW-½-10	Br.-Blk.-Blk. Parasitic Suppressor
26	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. AVC Network
27	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. " "
28	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. IF Screen
29	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red IF Plate Decoup.
30	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Diode Filter
31	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
32	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. AF Plate Load
33	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid
34	180Ω	½	66-1183340	BW-½-180	Br.-Gray-Br. Output Cathode
35	330KΩ	½		BTS-330K	Or.-Or.-Yl. Series Phono
36	10KΩ	1	66-3104340	BTA-10K	Br.-Blk.-Or. Filter
37	12KΩ	1	66-3124340	BTS-12K	Br.-Red-Or. "
38	25Ω	3	33-1334-5	AB-25	Red-Grn.-Blk. Rect. Ballast
39	120KΩ	½	66-4123340	BTS-120K	Br.-Red-Yl. Line Isolation

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
40	4500Ω	3.4Ω	380Ω	.7Ω	32-8351	A-3877	T22S46	A-2930	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-105		
41	PM	3.4Ω	36-1625	Mod. P5-X	5A15	
	CONE DIA.	VC DIA.				
42	4½"	9/16"				

R F COILS

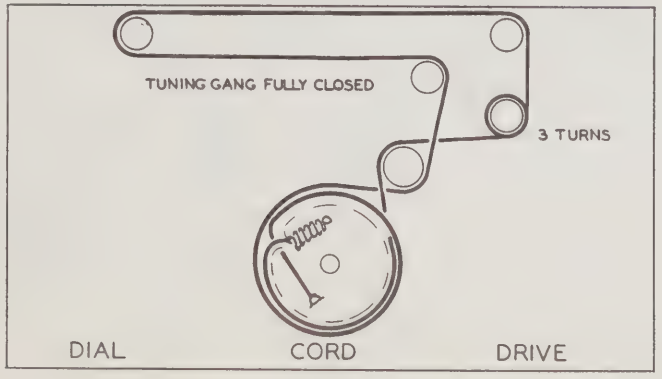
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	
43	Loop Ant.		3.7Ω	76-2127-7		
44	Osc. Coil	1.1Ω	9.4Ω	32-4190-2	14-1060	
45	Input IF	11Ω	11Ω	32-4160	16-6675	
46	Output IF	12.8Ω	13.2Ω	32-4240	16-6678	

DIAL LIGHT

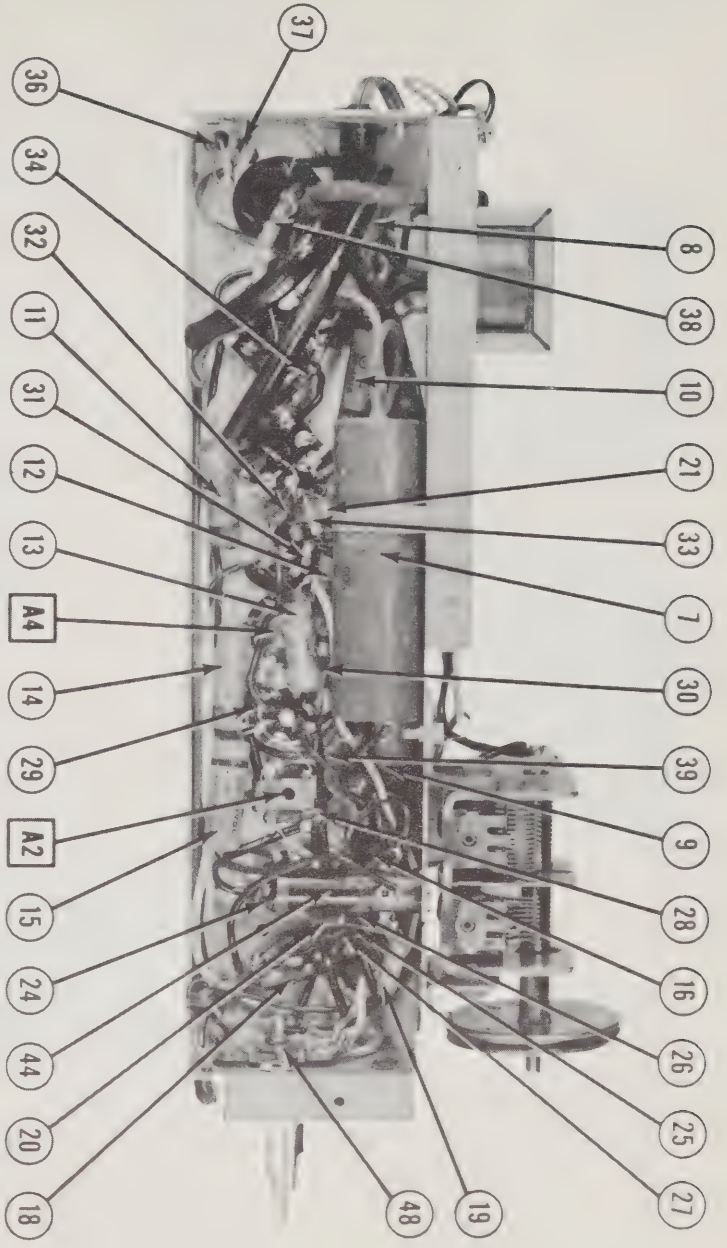
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					PHILCO PART No.		
47	Screw	120			32-3605		Type 7C7

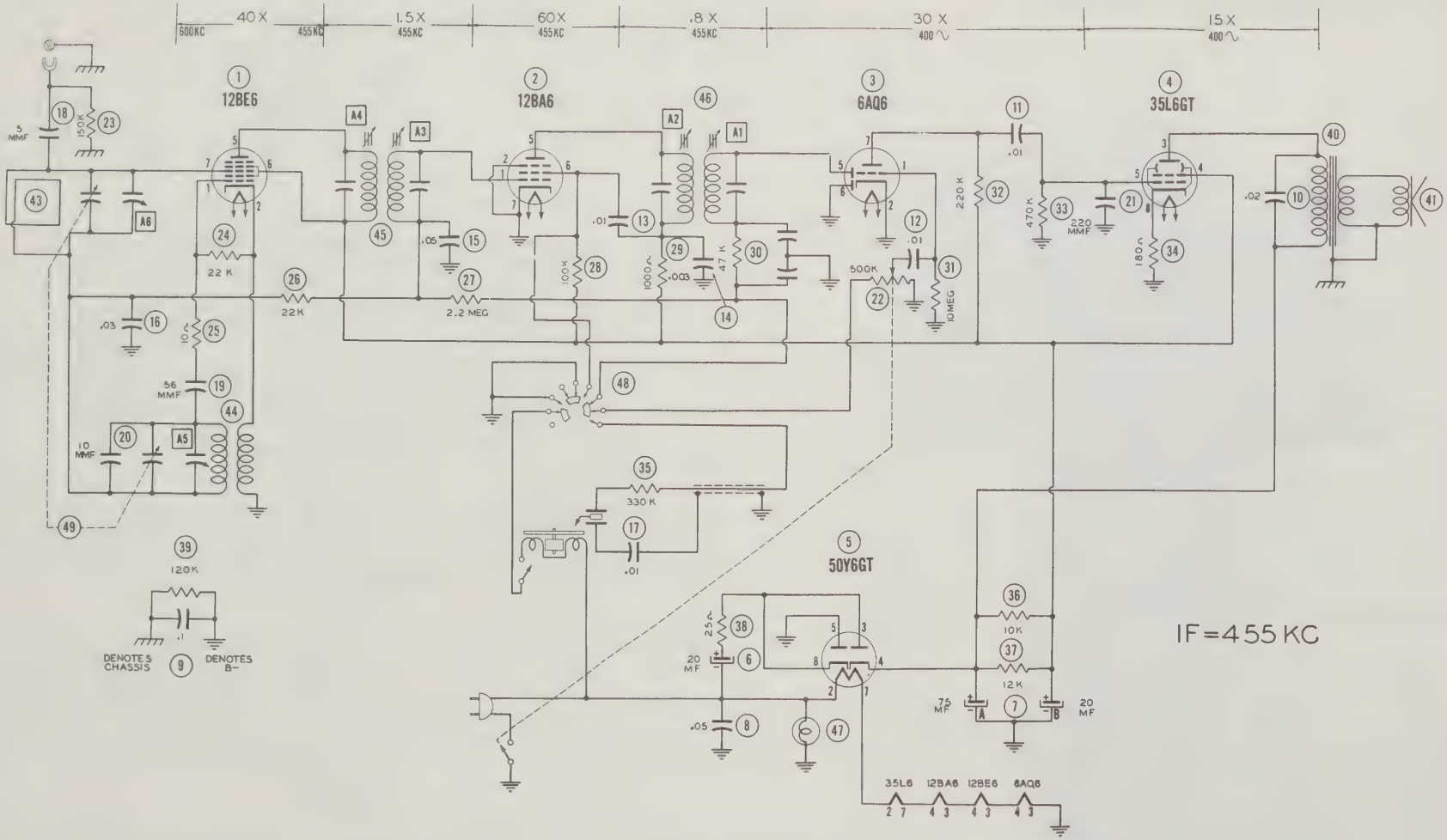
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
48	Switch	42-1847	Radio-Phono
49	2 Gang Var. Cap.	31-2727	(45-505MMF, 40-185MMF)
	Dial Scale	54-5001	
	Dial Pointer	56-3583-5	
	Knob	54-4527-3	



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

RADIO-PHONO SWITCH IN RADIO POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12BE6	-5.5VDC§	0V.	7.2VAC	21VAC	125VDC	125VDC	0V.	-
2	12BA6	-.4VDC	0V.	21VAC	35VAC	125VDC	35VDC	0V.	-
3	6AQ6	-.6VDC	0V.	0V.	7.2VAC	-.6VDC	0V.	50VDC	-
4	35L6GT	0V.	75VAC	225VDC	125VDC	0V.	0V.	35VAC	8VDC
5	50Y6GT	0V.	117VAC	115VDC	240VDC	0V.	0V.	75VAC	115VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12BE6	22KΩ	1.1Ω	6Ω	17Ω	240KΩ	240KΩ	2.7 Meg.	-
2	12BA6	2.7 Meg.	0Ω	17Ω	28Ω	240KΩ	340KΩ	0Ω	-
3	6AQ6	10 Meg.	0Ω	0Ω	6Ω	550KΩ	0Ω	460KΩ	-
4	35L6GT	INF.	54Ω	240KΩ	240KΩ	470KΩ	0Ω	28Ω	160Ω
5	50Y6GT	INF.	80Ω	150KΩ	240KΩ	0Ω	0Ω	54Ω	1.4KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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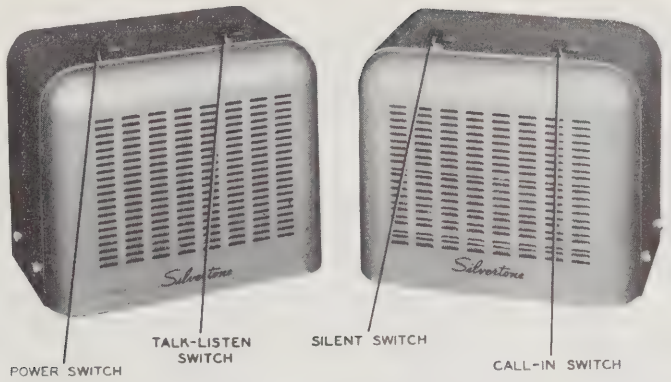
4815-21

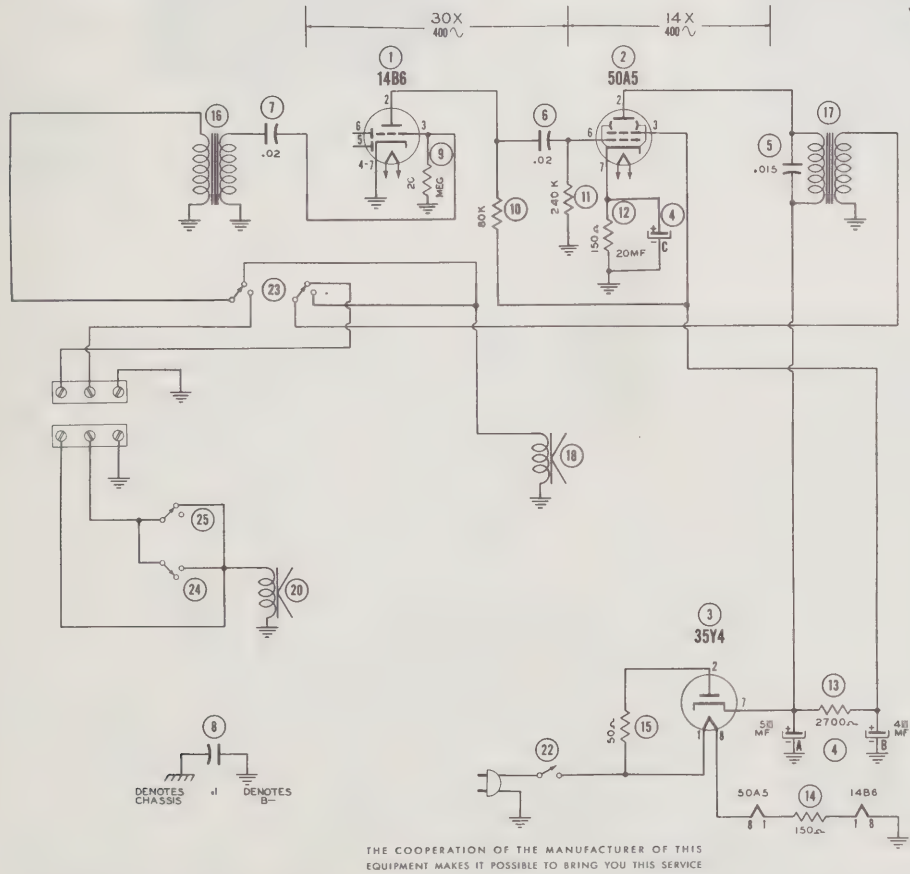
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



SILVERTONE MODEL 7300

TRADE NAME	Silvertone, Model 7300 (Ch. 435.240)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan St., Chicago, Ill.
TYPE SET	AC-DC Operated Inter-Communication System
TUBES (THREE)	Types, 14B6 AF Amp., 50A5 Power Output, 35Y4 Rectifier.
POWER SUPPLY	105-125 Volts AC-DC RATING .24 Amp. @ 117 Volts AC



VOLTAGE AND RESISTANCE READINGS

Pin No.	14B6 Volt	14B6 Res.
1	134VAC	13Ω
2	93VDC	1.6MΩ
3	-.18VDC	2.0 MegΩ
4	0V.	0Ω
5	0V.	INF.
6	0V.	INF.
7	0V.	0Ω
8	0V.	0Ω

Pin No.	50A5 Volt.	50A5 Res.
1	36VAC	17Ω
2	120VDC	100KΩ
3	115VDC	100KΩ
4	0V.	0Ω
5	0V.	INF.
6	0V.	270KΩ
7	1.5VDC	150Ω
8	85VAC	210Ω

Pin No.	35Y4 Volt.	35Y4 Res.
1	117VAC	250Ω
2	115VAC	260Ω
3	0V.	INF.
4	110VAC	240Ω
5	0V.	INF.
6	130VDC	100KΩ
7	130VDC	100KΩ
8	85VAC	210Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4815-22

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

HOWARD W. SAMS & CO., INC. Indianapolis . Indiana

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SILVERTONE MODEL
7300 (Ch. 435.240)

SILVERTONE MODEL
7300 (Ch. 435.240)

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	AF Amp.	14R6	14B6	8W	
2	Power Output	50R6	50A5	6AA	
3	Rectifier	35Y4	35Y4	5AL	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
4A	50	150	I240-3C	PRSA-50502	SDL5515C	DSB-304	TA-505	Filter-Red
B	40	150					" -Yl.	
C	20	25					TA-25	Cathode Bypass-Grn.
5	.015	400		484-015	DT4S15	ST-4-02	TC-12	Output Plate Bypass
6	.02	400		484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
7	.02	400		484-02	DT4S2	ST-4-02	TC-12	" "
8	.1	400		484-.1	DT4P1	ST-4-1	72P2	Line Isolation

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	IDENTIFICATION CODES
9	20 Meg.	½		BTS-22 Meg.	Red-Blk.-Blue AF Grid
10	80KΩ	½		BTS-82K	Gray-Blk.-Or. AF Plate Load
11	240KΩ	½		BTS-270K	Red-Yl.-Yl. Output Grid
12	150Ω	1		BW-1-150	Br.-Grn.-Br. Output Cathode
13	2700Ω	1		BTA-2700	Red-Vi.-Red Filter
14	150Ω	5		AB-150	Line Dropping
15	50Ω	½		BW-½-50	Grn.-Blk.-Blk. Rectifier Ballast

TRANSFORMER (OUTPUT)

ITEM No.	RATING: TURNS RATIO PRI. to SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SILVERTONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
16	1 to 20	.3Ω	570Ω	I240T1	A-4705	T20A01*	A-2919*	*Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SILVERTONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
17	2200Ω	3.0Ω	210Ω	.7Ω	I240T2	A-3876	T22S45	A-2928	

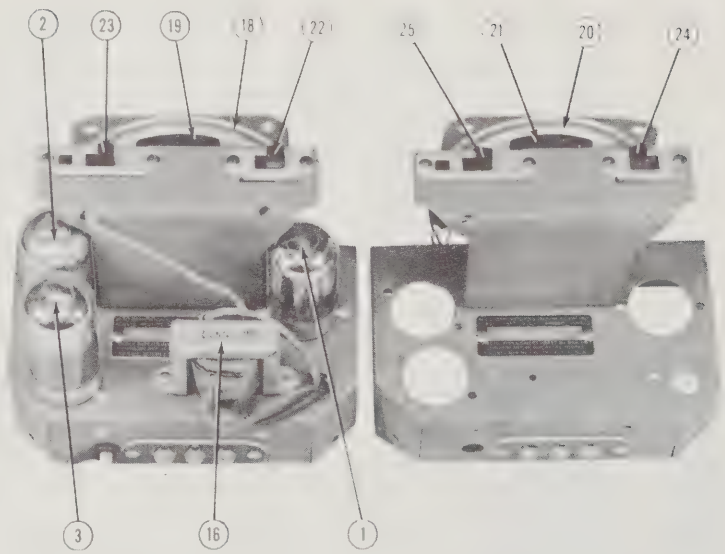
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: SILVERTONE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
18	FIELD	VC IMP.	I240SP		3A07†	†Fabricate new mounting bracket.
	PM	3.0Ω				
19	CONE DIA.	VC DIA.				
	3-3/8"	9/16"				
20	FIELD	VC IMP.	I240SP		3A07†	†Fabricate new mounting bracket.
	PM	3.0Ω				
21	CONE DIA.	VC DIA.				
	3-3/8"	9/16"				

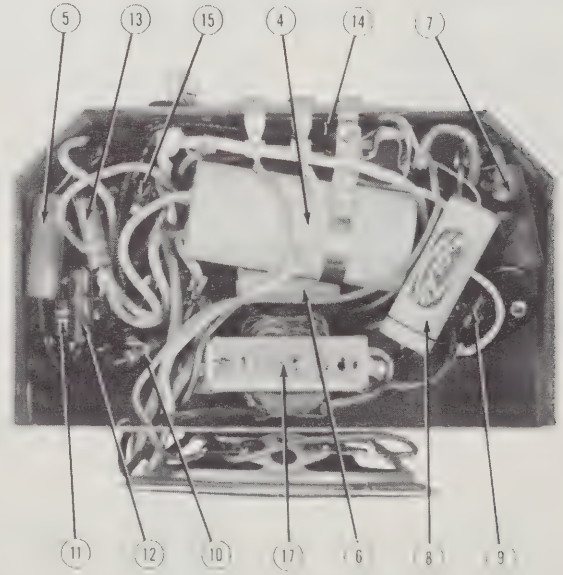
MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
22	Switch	I11SS	On-Off
23	"	I22SS	Talk-Listen
24	"	I11SS	Sub-Silent
25	"	I22SS	Sub Call In

CHASSIS—TOP VIEW



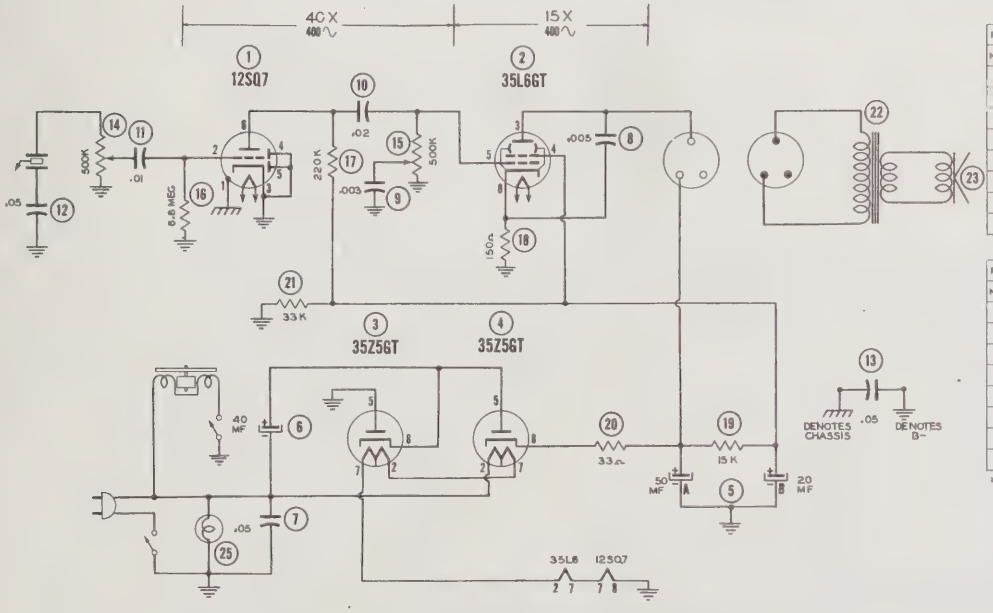
CHASSIS—BOTTOM VIEW



SILVERTONE MODEL
8145 (Ch. 109.631)

SILVERTONE MODEL 8145

TRADE NAME	Silvertone, Model 8145 (Ch. 109.631)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan St., Chicago, Ill.
TYPE SET	AC Operated Phono Player with 4 Tube Amplifier
TUBES (FOUR)	Types, 12SQ7GT AF Amp., 35L6GT Power Output, (2) 35Z5GT Rectifier
POWER SUPPLY	105-125 Volts AC RATING .41 Amp. @ 117 Volts AC



VOLTAGE AND RESISTANCE READINGS

Pin No.	12SQ7GT Volt.	12SQ7GT Res.	35L6GT Volt.	35L6GT Res.
1	0V.	INF.	0V.	INF.
2	-.8VDC	6.8 Meg.	48VAC	4Ω
3	0V.	0Ω	220VDC	40KΩ
4	0V.	0Ω	150VDC	30KΩ
5	0V.	0Ω	0V.	500KΩ
6	50VDC	250KΩ	0V.	INF.
7	12VAC	13Ω	12VAC	13Ω
8	0V.	0Ω	9.8VDC	15KΩ

Pin No.	35Z5GT Volt.	35Z5GT Res.	35Z5GT Volt	35Z5GT Res
1	0V.	INF.	0V.	INF.
2	85VAC	65Ω	117VAC	85Ω
3	75VAC	58Ω	110VAC	78Ω
4	0V.	INF.	0V.	INF.
5	0V.	0Ω	125VDC	300KΩ
6	0V.	INF.	0V.	INF.
7	48VAC	40Ω	85VAC	65Ω
8	125VDC	300KΩ	245VDC	40KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	AF Amp.	12SQ7GT	12SQ7GT	8Q	
2	Power Output	35L6GT	35L6GT	7AC	
3	Rectifier	35Z5GT	35Z5GT	6AD	
4	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	50	300	D50383-1	[illegible]8J	UP5035	DY-50-350	EL-5	■ Filter
B	20	150		PRS150/20	BR2015	M-20-150	UT-201	▲ "
6	40	150	DA50415-2	PRS150/40	BR4015	M-40-150	UT-401	"
7	.05	400	DB50375-1	484-05	DT4S5	ST-4-05	TC-15	Line Filter
8	.005	600	DC50453-1	684-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
9	.003	600	DB50137	684-003	DT6D3	ST-6-003	TC-23	Tone Comp.
10	.02	400	DB50467	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
11	.01	400	DB50468	484-01	DT4S1	ST-4-01	TC-11	" "
12	.05	400	DB50375-1	484-05	DT4S5	ST-4-05	TC-15	Phono Isolation
13	.05	400	DB50375-1	484-05	DT4S5	ST-4-05	72P1	Line Isolation

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
14A	500KΩ	½	DB55553-2	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 14A per instructions
15A	500KΩ	½	DB55578-2	D13-133	AM-60-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 15A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	IDENTIFICATION CODES
16	6.8 Meg.	½		BTS-6.8 Meg.	Blue-Gray-Grn. Audio Grid
17	220KΩ	½		BTS-220K	Red-Red-Yl. Audio Plate Load
18	150Ω	½		BW-2-150	Br.-Grn.-Br. Output Cathode
19	15KΩ	1		BTA-15K	Br.-Grn.-Or. Filter
20	33Ω	1		BW-1-33	Or.-Or.-Blk. Surge Limiter
21	33KΩ	1		BTA-33K	Or.-Or.-Or. Bleeder

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SILVERTONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
22	4000Ω	3.4Ω	350Ω	.5Ω	Part of C59911	A-3849	T22S45*	A-2902	*Drill one new mounting hole.

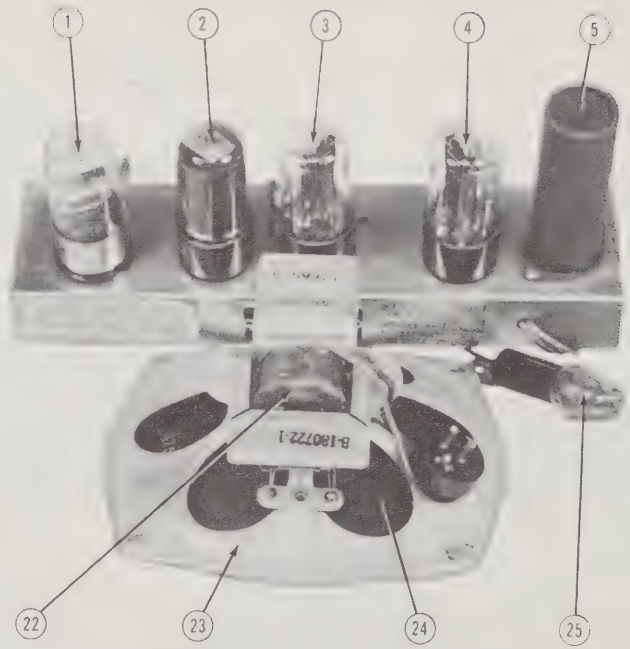
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: SILVERTONE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
23	FIELD	VC IMP.	C59011	ST-112	6A21	
	PM	3.4Ω		Mod. P6-T		
24	CONE DIA.	VC DIA.				
	6-1/8"	3/4"				

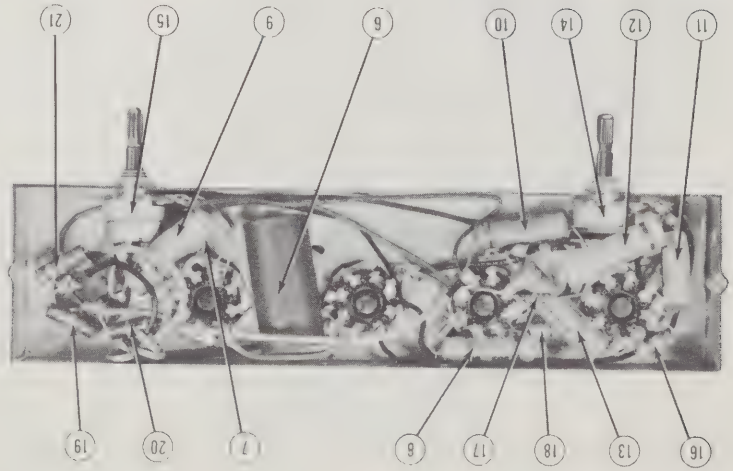
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: SILVERTONE PART No.		INSTALLATION NOTES
25	Screw	120					Type 7C7

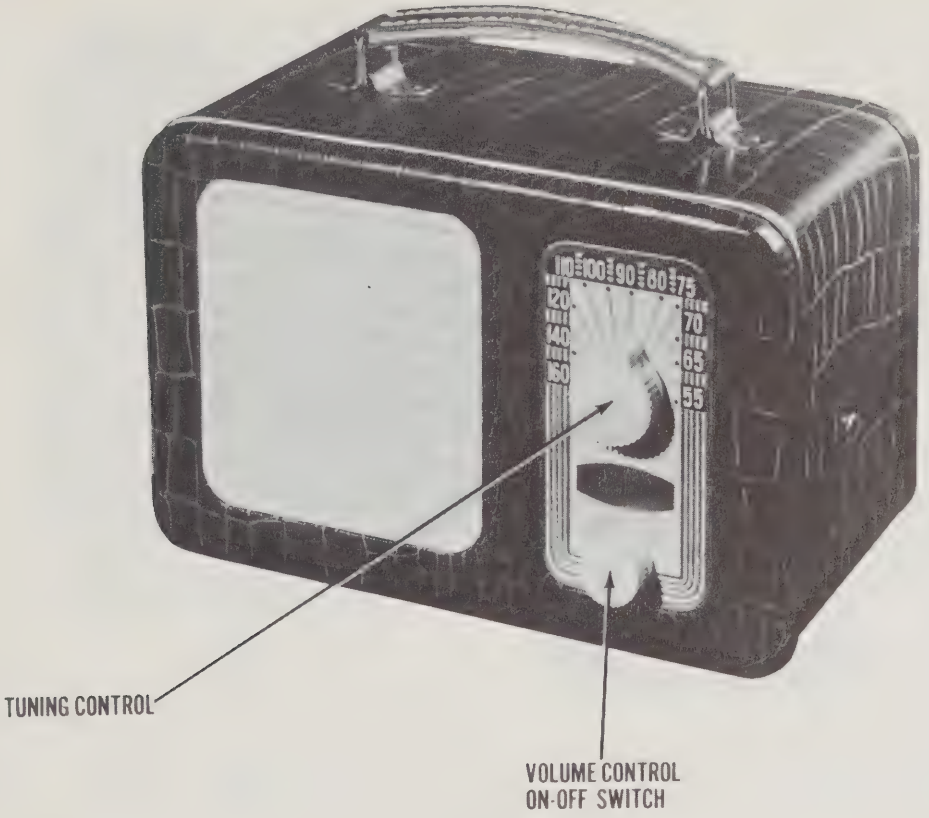
CHASSIS—TOP VIEW



CHASSIS—BOTTOM VIEW



TRAV-LER MODEL 5049
BATTERY OPERATED



TRAV-LER MODEL 5049
BATTERY OPERATED

TRAV-LER MODEL 5049

TRADE NAME	Trav-ler Model 5049
MANUFACTURER	Trav-ler Radio & Tele. Corp., 571 W. Jackson Blvd., Chicago, Ill.
TYPE SET	Battery Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 3V4 Power Output.
POWER SUPPLY	1.5 Volt "A" Supply and 67.5 Volt "B" Supply
RATING	220MA @ 1.5 Volts DC and 6.5MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1640KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. Reassemble receiver in cabinet
2		Loop	1400KC	1400KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust A5 for maximum output.
3		"	"	Tune for maximum output.	"	A6	Adjust for maximum output.

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DATE 9/48-#4815-24 SET #45-FOLDER #24

PARTS LIST AND DESCRIPTIONS

TRAV-LER MODEL 1C4

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		TRAV-LER PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1U4	1U4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	TRAV-LER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5	10	75		PRS150/12	BR1215	M-10-150	UT-121	Filter
6	.005	400		484-.005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
7	.01	400		484-.01	DT4S1	ST-4-01	TC-11	Audio Coupling
8	.01	400		484-.01	DT4S1	ST-4-01	TC-11	AF Screen Bypass
9	.01	400		484-.01	DT4S1	ST-4-01	TC-11	Audio Coupling
10	.01	400		484-.01	DT4S1	ST-4-01	TC-11	AVC Filter
11	.01	400		484-.01	DT4S1	ST-4-01	TC-11	Conv. Screen Decoup.
12	250	500		1468-.00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
13	250	500		1468-.00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
14	250	500		1468-.00025	5W5T25	MO.5-325	1FM-325	Osc. Grid Cap.

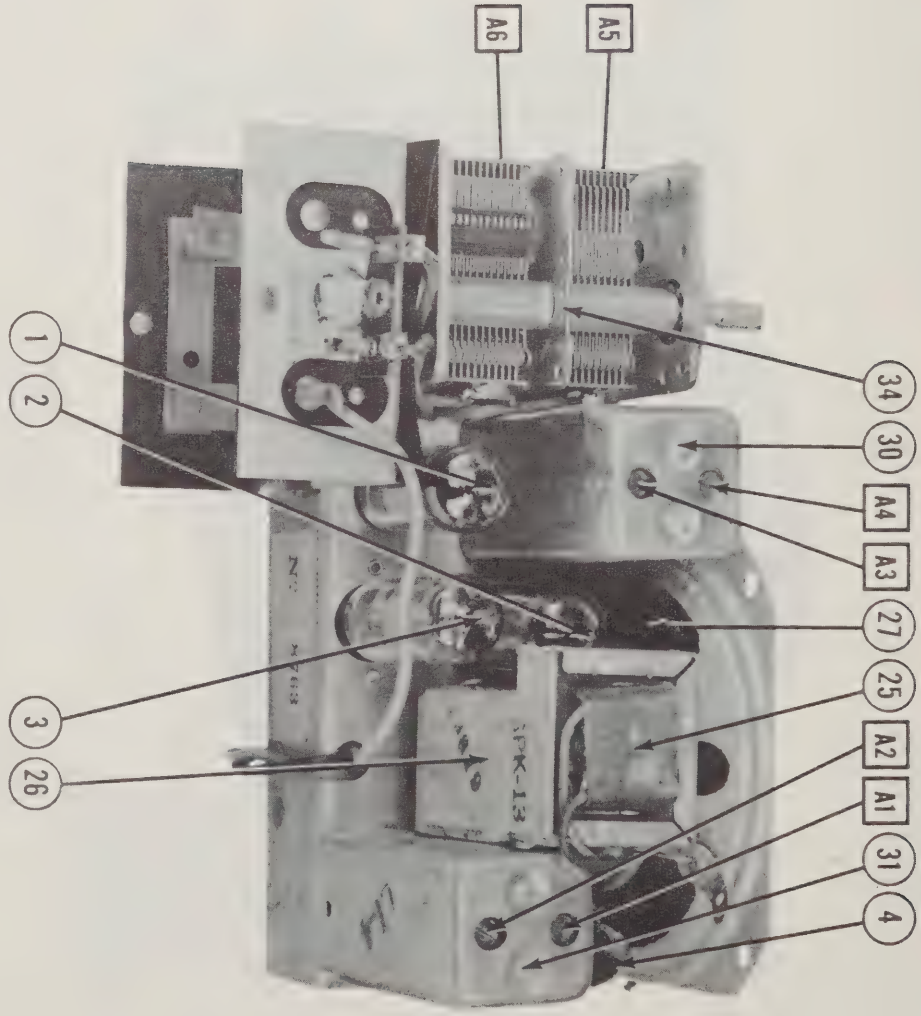
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	TRAV-LER PART No.	IRC PART No.	CLAROSTAT PART No.	
15A	1 Meg.	½	VC-8		15/16-63-Z	Volume Control
B	Shaft		Not Req.		DPST	Specify sw. attached at factory.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TRAV-LER PART No.	IRC PART No.	
16	220KΩ	½	1R-20	BTS-220K	Red-Red-Yl. Osc. Grid
17	3.3 Meg.	½	1R-23	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
18	10KΩ	½	1R-37	BTS-10K	Br.-Blk.-Or. Conv. Screen Decoupling
19	82KΩ	½	1R-31	BTS-82K	Gray-Red-Or. Diode Filter
20	10 Meg.	½	1R-3	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
21	3.3 Meg.	½	1R-23	BTS-3.3 Meg.	Or.-Or.-Grn. AF Screen
22	1 Meg.	½	1R-12	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
23	2.2 Meg.	½	1R-13	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
24	270Ω	½		BW-½-270	Red-Vi.-Br. Bias

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TRAV-LER PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
25	5350Ω	3.6Ω	300Ω	.6Ω	Part of SPK-13	A-3329#		A-2928#	#Bend mounting tabs down, file out slots and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRAV-LER PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
26	PM	3.6Ω	SPK-13		3A07	
	CONE DIA.	VC DIA.				
27	3-7/16"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TRAV-LER PART No.	MEISSNER PART No.	
28	Loop Ant.		1.7Ω	LL-18		
29	Osc. Coil	1.3Ω	7.7Ω	LO-16	14-1060	
30	Input IF	19Ω	20Ω	LI-3	16-6666	
31	Output IF	19.5Ω	19Ω	LI-4	16-6667	

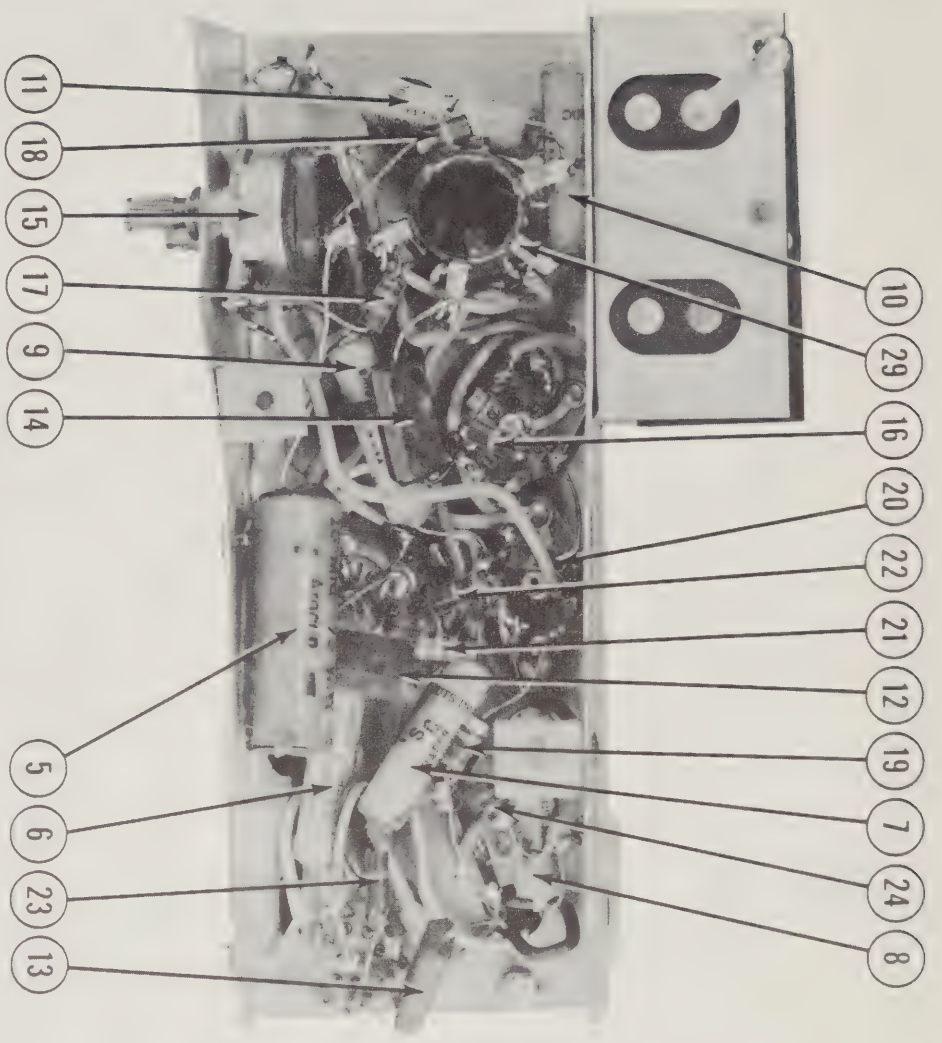
BATTERIES

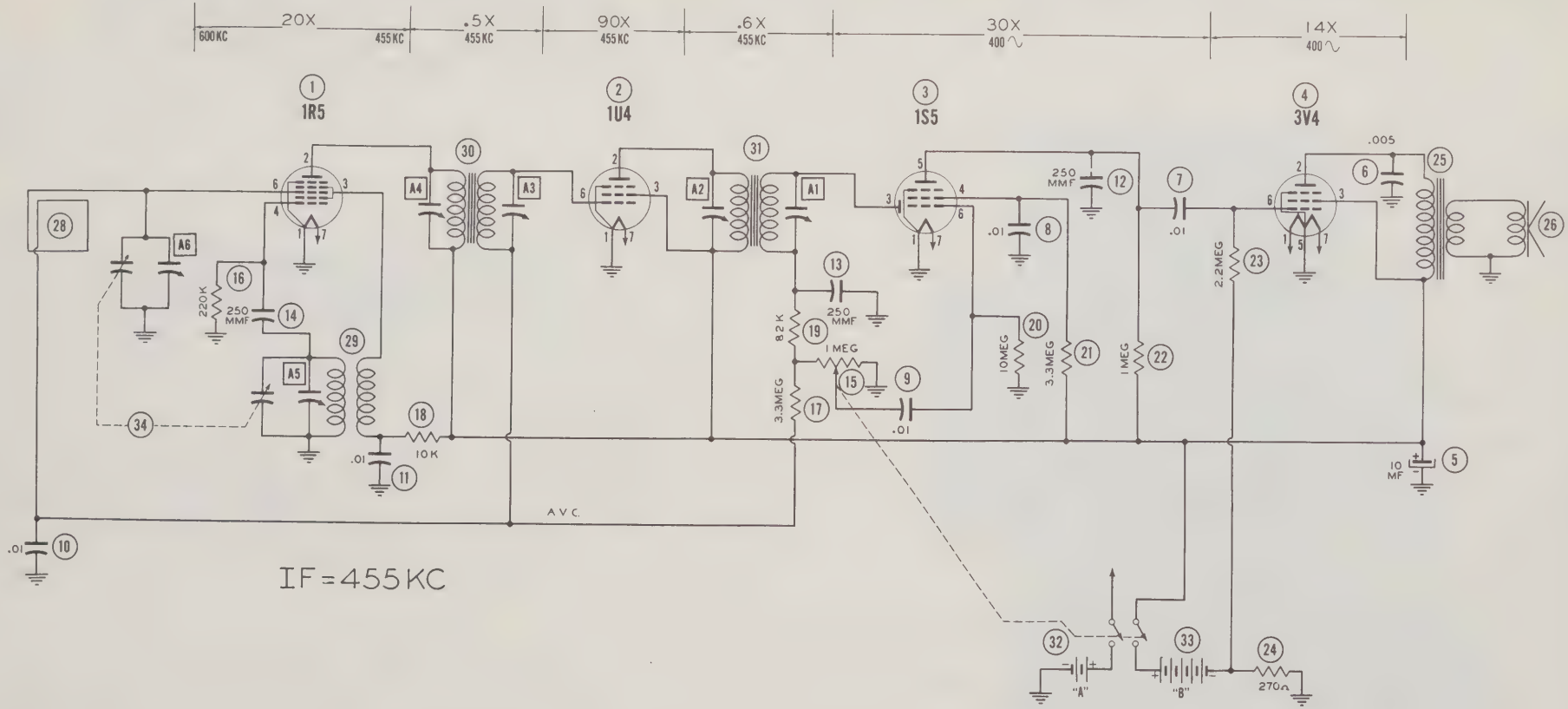
ITEM No.	VOLTAGE	TRAV-LER PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
32	1.5V "A"		950			2R			2 Used in Parallel
33	67.5V "B"			467			XX45		

MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
34	2 Gang Var. Cap	GC-4	(30-470MMF, 30-180MMF)
A6	Trimmer	TC-7	Ant. Adj.

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	65VDC	45VDC	-3.6VDC§	0V.	0V.	1.4VDC
2	1U4	0V.	65VDC	65VDC	0V.	0V.	0V.	1.4VDC
3	1S5	0V.	0V.	0V.	3.2VDC	0VDC	0V.	1.4VDC
4	3V4	14VDC	65VDC	65VDC	65VDC	0V.	-.2VDC	1.4VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	100KΩ	110KΩ	220KΩ	0Ω	4.3 Meg.	*
2	1U4	0Ω	100KΩ	100KΩ	INF.	0Ω	4.3 Meg.	*
3	1S5	0Ω	900KΩ	1 Meg.	3.3 Meg.	1 Meg.	10 Meg.	*
4	3V4	*	100KΩ	100KΩ	100KΩ	0Ω	2.2 Meg.	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

TRUETONE MODEL D1836A

TRADE NAME	Truetone, Models D1836, D1836A (Factory No. 26A85-856A)
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	AC Operated Combination Phono-Radio, AM-FM Superheterodyne Receiver
TUBES (SEVEN)	Types, 6BE6 AM-FM Converter, 6BA6 1st IF Amp., 6BA6 2nd IF Amp., 6AL5 Ratio Det., 6AT6 Det.-AVC-AF, 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.52 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	540-1620KC FREQ. MOD. 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 1 (grid) of 6BA6 1st IF Tube (2). Low side to chassis.	455KC	BC (Center position)	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output
2	.1 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	"	"	"	"	A3,A4	" " " "
3	.1 MFD.	"	1620KC	"	"	"	A5	" " " "
4	50MMFD.	High side to external ant. lead. Low side to chassis.	1400KC	"	Tune for maximum output.	"	A6	Adjust for maximum output Set dial pointer to 1400KC calibration mark on dial.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	.01 MFD	High side to Pin 1 (grid) of 6BA6 2nd IF Tube (3). Low side to chassis.	10.7MC (Unmodulated)	FM (fully clockwise)	Tuning cap. fully open.	DC probe to Point (A) .Common to chassis	A7	Adjust for maximum deflection.
6	.01 MFD	"	"	"	"	DC probe to Point (B) .Common to chassis	A8	Use a zero center scale VTVM if available and adjust for zero deflection. Repeat Steps 5 and 6 until no further improvement can be made.
7	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (2). Low side to chassis.	"	"	"	DC probe to Point (A) .Common to chassis	A9,A10	Adjust for maximum deflection.
8	.01 MFD	Disconnect lead to Pin 7 (grid) of 6BE6. Shunt 100KΩ resistor from Pin 7 to chassis. High side of sig. gen. to Pin 7. Low side to chassis.	"	"	"	"	A11, A12	Adjust for maximum deflection. Remove 100KΩ resistor from Pin 7 of 6BE6 and replace grid lead. Continue with FM-RF alignment in Step 9.

FOR ALTERNATE FM IF ALIGNMENT AND FM RF ALIGNMENT SEE PAGE 4 OF THIS FOLDER.

TRUETONE MODEL D1836, D1836A (Fact. 26A85-856A)

TRUETONE MODEL D1836, D1836A (Fact. 26A85-856A)

HOWARD W. SAMS & CO., INC. Indianapolis 7, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	AM-FM Converter	6BE6	6BE6	7CH	
2	1st IF Amp.	6BA6	6BA6	7BK	
3	2nd IF Amp.	6BA6	6BA6	7BK	
4	Ratio Det.	6AL5	6AL5	6BT	
5	Det.-AVC-AF	6AT6	6AT6	7BT	
6	Power Output	6V6GT	6V6GT	7AC	
7	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	40	350	45X350		UP4445C	DY-406	EL-424#	● Filter
B	40	350			BR2045		UT-203	■ "
C	20	350						▲ "
D	20	25						Cathode Bypass
9	5	100	47X513	PRS150/4	BR415	M-8-150	UT-41	Stabilizing Cap.
10	.001	600	H66102	684-001	DT6D1	ST-6-001	TC-21	Output Plate Bypass
11	.004	200	B66402	484-004	DT6D4	ST-6-004	TC-24	Tone Comp.
12	.04	200	B66403	484-04	DT4S4	ST-4-04	TC-14	" "
13	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
14	.005	400	D66502	484-005	DT6D5	ST-6-005	TC-25	" "
15	.01	400	D66103	484-01	DT4S1	ST-4-01	TC-11	Conv. Screen Decoup.
16	.05	200	B66503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
17	220	300	47X468	1468-0002	5W5T2	MO.5-32	1FM-32	AF Plate Bypass-Cer.
18	68	500	47X471	1468-000075	5W5Q7	MOS.5-47	MS-47	Tone Comp.
19	470	500	47X510	1468-0005	5W5T5	MO.5-35	1FM-35	Diode Load Cap.
20	2700	500	47X492	1467-003	1W5D3	MW.5-23	1FM-23	De-emphasis
21	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Decoupling-Cer.
22	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Cathode Byp.-Cer.
23A	50	300	*	1468-00005	5W5Q5	MO.5-45	1FM-45	Diode RF Filter-Cer.
B	50	300	*	1468-00005	5W5Q5	MO.5-45	1FM-45	" " " "
24	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	1st IF Decoupling-Cer.
25	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	1st IF Cathode Byp.-Cer.
26	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	Conv. Plate Decoup.-Cer.
27	10	300	47X512	1468-00001	5W5Q1	MO.5-41	MS-41	Conv. Plate Bypass-Cer.
28	47	300	47X463	1468-00005	5W5Q5	MO.5-45	1FM-45	Conv. Screen Bypass-Cer.
29	47	300	47X517	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
30	100	300	47X511	1469-0001	5R5T1	MOS.5-31	MS-31	Fixed Padder-Cer.
31	5	300	47X513	1468-000005	5W5V5	MO.5-55	MS-55	Feedback-Cer.
32	500	300	47X508	1468-0005	5W5T5	MO.5-35	1FM-35	Filament Bypass-Cer.

*Item 23A, 23B and 41 are a resistor-capacitor combination and may be obtained as a unit under Part No. 76X1.
#Parallel sections to obtain desired capacity.

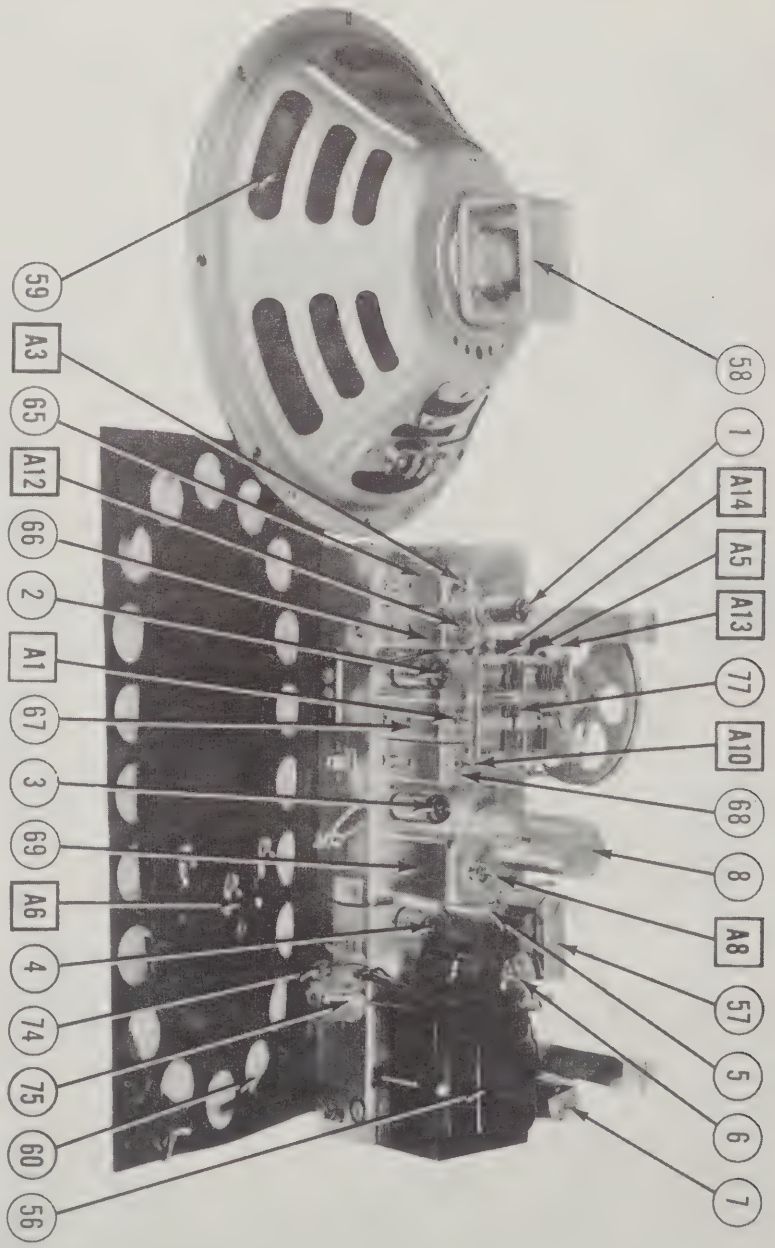
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
33A	500KΩ	½	36X371	D13-133X	AM-67-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 33A per instructions
C	Switch		" "	41	SW-A	" " " " "
34A	3 Meg.	½	40X284	D13-140	AT-78	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 34A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	IDENTIFICATION CODES
35	22KΩ	½	B84223	BTS-22K	Red-Red-Or. Osc. Grid
36	3900Ω	½	B83392	BTS-3900	Or.-White-Red Conv. Plate Decoupling
37	1200Ω	½	B84122	BTS-1200	Br.-Red-Red Conv. Plate Decoupling
38	8200Ω	2	D84822	BT-2-8200	Gray-Red-Red Bleeder
39	68Ω	½	B83680		Blue-Gray-Blk. 1st IF Cathode

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
40	1200Ω	1	R64122	BTS-1200	Br.-Red-Red 1st IF Decoup.
41	47KΩ	"	"	BTS-47K	Diode Filter-See Note
42	2.2 Meg.	1	R64225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
43	1 Meg.	1	R64105	BTS-1 Meg.	Br.-Blk.-Grn. " "
44	68Ω	1	R63680		Blue-Gray-Blk. 2nd IF Cathode
45	1000Ω	1	R64102	BTS-1000	Br.-Blk.-Red 2nd IF Decoupling
46	27KΩ	1	R64273	BTS-27K	Red-Vi.-Or. De-emphasis
47	6800Ω	1	R64682	BTS-6800	Blue-Gray-Red Ratio-Det. Diode Load
48	6800Ω	1	R64682	BTS-6800	Blue-Gray-Red " " " "
49	15KΩ	1	R64153	BTS-15K	Br.-Grn.-Or. Tone Comp.
50	10 Meg.	1	R64106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
51	470KΩ	1	R64474	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
52	470KΩ	1	R64474	BTS-470K	Yl.-Vi.-Yl. Output Grid
53	270Ω	1	R64271	BW-½-270	Red-Vi.-Br. Output Cathode
54	470KΩ	1	R64474	BTS-470K	Yl.-Vi.-Yl. Series Phono
55A	1400Ω	4	43X224	AR-1400	Filter
B	1400Ω	4		AR-1450	"

*Item 41, 23A and 23B are a resistor-capacitor combination and may be obtained as a unit under Part No. 76X1.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDARSON PART No.	REPLACEMENT DATA MERIT PART No.
56	117V AC @ .52A	520V CT @ .082A DC	5.1V AC @ 2.0A	6.3V AC @ 2.4A	53X250		T22R02	

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDAR'N PART No.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
57	3700Ω	3.2Ω	475Ω	.2Ω	51X134	A-3823	T22S87	A-2902	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-102		
58	PM	3.2Ω	12A486	Mod. P12-S	12A6	
	CONE DIA.	VC DIA.				
59	11-3/8"	1"				

R F COILS

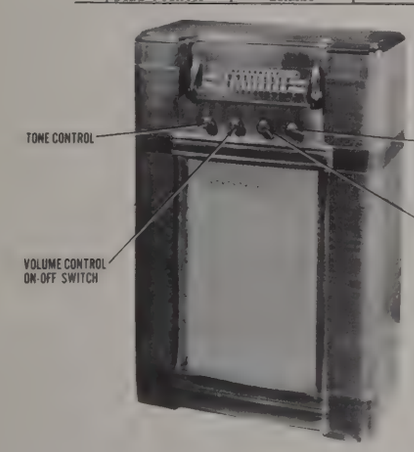
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA MEISSNER PART No.	
60	Loop Ant.	0Ω	.9Ω	26A478		
61	FM Di-Pole		0Ω	9A1962		
62	FM Ant.Coil		0Ω	9A1956		
63	BC Osc.Coil	.5Ω	5.1Ω	9A1929	14-1060	
64	FM Osc.Coil		0Ω	9A1938		
65	AM 1st IF	15.5Ω	15.1Ω	9A1934	16-6678	
66	FM 1st IF	.6Ω	.1Ω	9A1932		
67	AM 2nd IF	14.8Ω	14.8Ω	9A1935	16-6678	
68	FM 2nd IF	.6Ω	.1Ω	9A1933		
69	FM Disc. Trans.	.9Ω	.1Ω	9A1936		
70	Filament Choke		.3Ω	9A1882		
71	Conv. Plate Choke		.3Ω	9A1882		
72	Parasitic Choke		0Ω	9A1967		Wound on a 10Ω 1/8 W. Resistor
73	Parasitic Choke		0Ω	9A1967		" " " " " " "

DIAL LIGHT

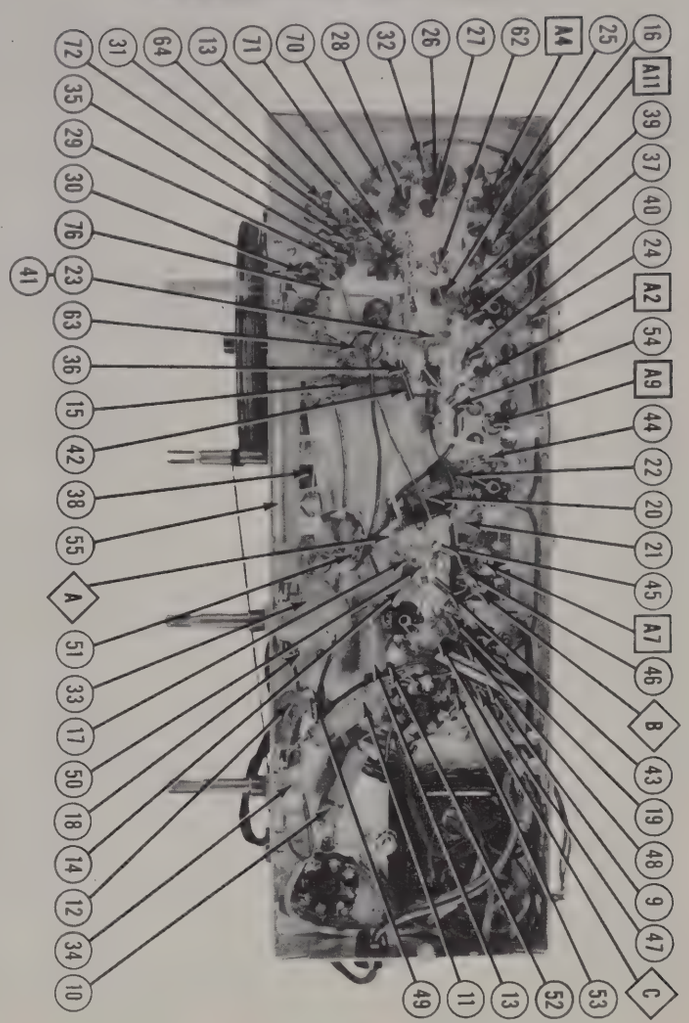
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA TRUETONE PART No.		INSTALLATION NOTES
74	Bayonet	7.5	0.2	White	7A32		Type #51
75	"	7.5	0.2	"	7A32		" "

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
76	Switch	2A373	Band-Phono
77	Tuning Gang	14A201	(40-530MMF, 60-230MMF)
A13	Trimmer	17A247	FM Osc. Adj.
	Dial	58X697	
	Dial Pointer	15X229	



CHASSIS—BOTTOM VIEW



FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
5	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (2). Low side to chassis.	10.7MC (Freq. Mod.)	FM	Tuning cap. fully open.	Vertical input to Point ◇. Ground to chassis.	A7,A9, A10	Disconnect 5 MFD cap. from Point ◇. Adjust A7, A9 and A10 for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
6	.01 MFD	Disconnect lead to Pin 7 (grid) of 6BE6. Shunt 100KΩ resistor from Pin 7 to chassis. High side to Pin 7. Low side to chassis.	"	"	"	"	All, A12	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
7	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (2). Low side to chassis.	"	"	"	Vertical input to Point ◇. Ground to chassis.	A8	Reconnect 5 MFD cap. to Point ◇. Adjust A8 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM-RF Alignment in Step 9.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	300Ω Carbon res.	High side dip. unit ground terminal. Low side to chassis.	106.5MC (Unmodulated)	FM	Tuning cap. fully open.	DC probe to ◇. Common to chassis	A13	Adjust for maximum deflection.
10	"	"	104.5MC	"	Tune for maximum deflection.	"	A14	"

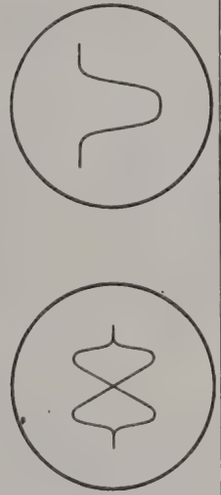


FIG. 1

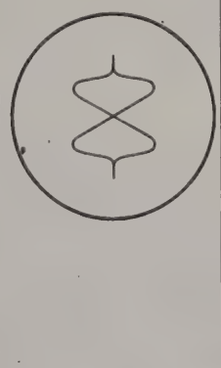
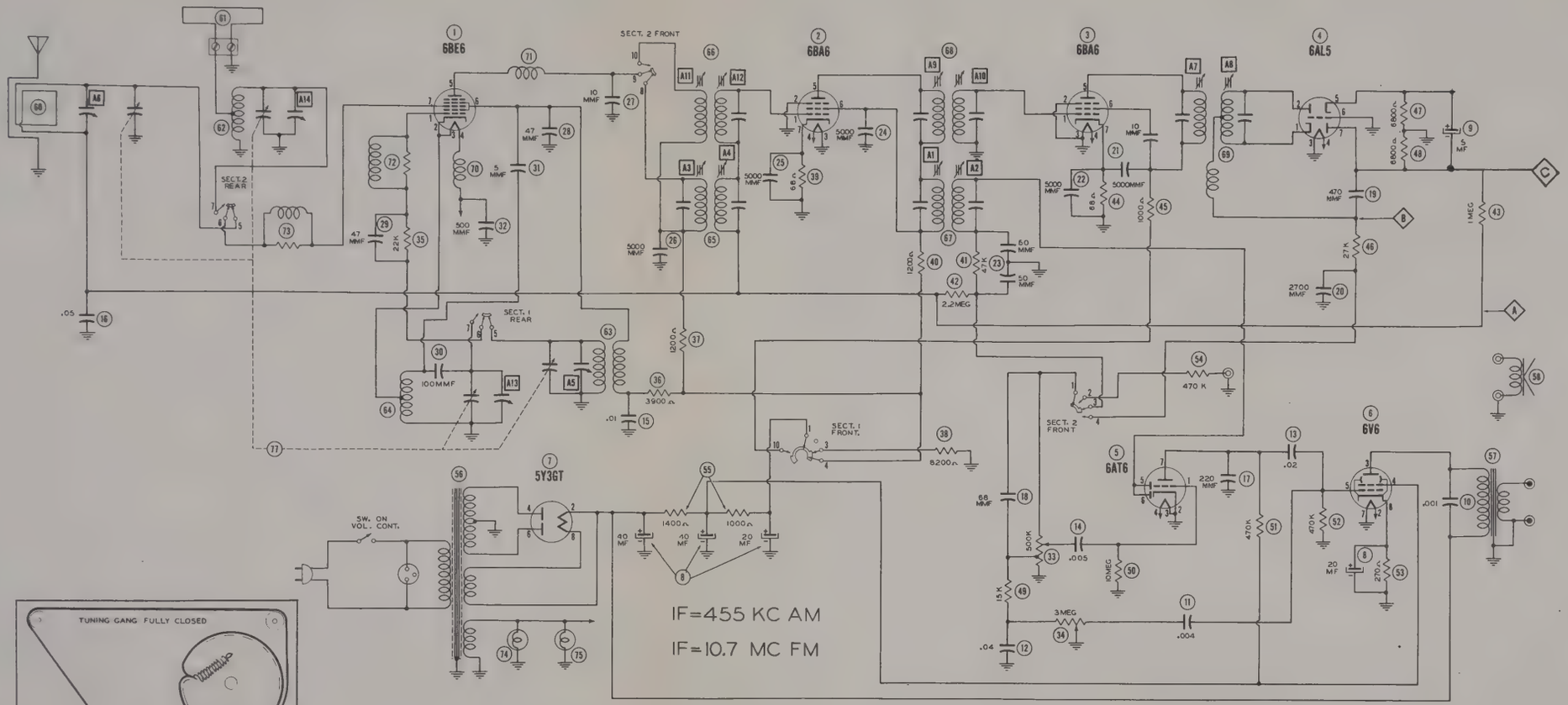


FIG. 2

FOR AM ALIGNMENT AND ALTERNATE FM IF ALIGNMENT SEE FRONT PAGE OF THIS FOLDER.



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BE6	-7.5VDC	0V.	0V.	6.3VAC	125VDC	100VDC	-.2VDC	-
2	6BA6	-.2V	0V.	0V.	6.3VAC	110VDC	110VDC	1.2VDC	-
‡ 3	6BA6	0V.	0V.	0V.	6.3VAC	120VDC	120VDC	1.2VDC	-
‡ 4	6AL5	-.6VDC	3VDC	0V.	6.3VAC	.2VDC	0V.	-.2VDC	-
5	6AT6	-.8V	0V.	0V.	6.3VAC	-.6VDC	-.6VDC	80VDC	-
6	6V6GT	0V.	6.3VAC	240VDC	190VDC	0V.	0V.	0V.	8.5VDC
7	5Y3GT	0V.	250VDC	0V.	260VAC	0V.	260VAC	0V.	250VDC

‡TAKEN WITH VACUUM TUBE VOLTMETER.

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BE6	22KΩ	0Ω	0Ω	.1Ω	2.4KΩ	12KΩ	850KΩ	-
2	6BA6	850KΩ	0Ω	0Ω	.1Ω	2.4KΩ	2.4KΩ	66Ω	-
‡ 3	6BA6	.1Ω	0Ω	0Ω	.1Ω	63KΩ	63KΩ	66Ω	-
‡ 4	6AL5	530KΩ	530KΩ	0Ω	.1Ω	6.8KΩ	INF.	6.8KΩ	-
5	6AT6	10 Meg.	0Ω	0Ω	.1Ω	4.4KΩ	4.4KΩ	4.0KΩ	-
6	6V6GT	INF.	.1Ω	11KΩ	2.6KΩ	470KΩ	.5Ω	0Ω	270Ω
7	5Y3GT	INF.	11KΩ	INF.	95Ω	INF.	0Ω	INF.	11KΩ

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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TRUETONE MODEL D4818
(Fact. #134DX)

TRUETONE MODEL D4818

TRADE NAME	Truetone, Model D4818 (Factory No. 134DX)
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Battery Operated Universal Automotive Superheterodyne Receiver
TUBES (SIX)	Types, 6SK7GT RF Amp., 6SA7GT Converter, 6SK7GT IF Amp., 6SQ7GT Det.-AVC-AF, 6V6GT Power Output, 6X5GT Rectifier.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	540-1600KC RATING 5.2 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 6SA7. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	250MMFD	High side to ant. receptacle. Low side to chassis.	"	"	"	A5	Adjust for minimum output.
3	250MMFD	"	1600KC	"	"	A6	Adjust for maximum output.
4	250MMFD	"	1400KC	Tune for maximum output.	"	A7,A8	" " " "
5	250MMFD	"	600KC	"	"	A9	Adjust for maximum output. Repeat Steps 3, 4 & 5 until no further improvement can be made.

After receiver is installed in car, and antenna fully extended, tune in a weak station near 600KC and adjust A8 for maximum volume.

HOWARD W. SAMS & CO., INC. Indianapolis · Indiana

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DATE 9/48-#4815-26 SET #45-FOLDER #26

PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D4618

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6SK7GT	6SK7GT	8N	
2	Converter	6SA7GT	6SA7GT	8AD	
3	IF Amp.	6SK7GT	6SK7GT	8N	
4	Det.-AVC-AF	6SQ7GT	6SQ7GT	8Q	
5	Power Output	6V6GT	6V6GT	7AC	
6	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	30	350	A18-289	AF64K4A	UP2235C*	DY-310	EL-323	■ Filter
B	20	350			BR1235*	M-20-350		▲ "
C	20	25						Cathode Bypass
8	.005	1600	A16-185	1689-.005	MD16D5	STM-16-005	TR-25	Buffer
9	.5	100	A16-184		DT2P5	SHH-1		Hash Filter
10	.5	100	A16-184		DT2P5	SHH-1		" "
11	.01	400	A16-192	484-.01	DT4S1	ST-4-01	TC-11	Output Plate Bypass
12	.05	600	A16-183	684-.05	DT6S5	ST-6-05	TC-15	Audio Coupling
13	.005	600	A16-190	684-.005	DT6D5	ST-6-005	TC-25	" "
14	.2	400	A16-188	484-.2	DT4P2	ST-4-2	TC-2	RF Bypass Pwr. Supply
15	.1	400	A16-187	484-.1	DT4P1	ST-4-1	TC-2	IF Cathode Bypass
16	.1	400	A16-187	484-.1	DT4P1	ST-4-1	TC-2	Screen Bypass
17	.1	400	A16-187	484-.1	DT4P1	ST-4-1	TC-2	RF Cathode Bypass
18	.05	400	A16-186	484-.05	DT4S5	ST-4-05	TC-15	AVC Filter
19	.01	400	A16-192	484-.01	DT4S1	ST-4-01	TC-11	Ant. Coupling
20	250	500	A15-176	1468-00025	5W5T25	MO.5-325	1FM-325	Hash Filter
21	250	500	A15-176	1468-00025	5W5T25	MO.5-325	1FM-325	" "
22	1000	300	A16-191	1468-001	1W5D1	MO.3-21	1FM-21	AF Plate Bypass-Cer.
23	250	500	A15-176	1468-00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
24	50	300	A15-204	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
25	10	300		1469-00001	5R5Q1	MOS.5-41	MS-41	Fixed Trimmer-Cer.
26	20	300	A15-202		5R5Q2	MOS.5-42	MS-42	Fixed Padder-Cer.
27	100	300	A15-196	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.

*Parallel sections to obtain desired capacity.

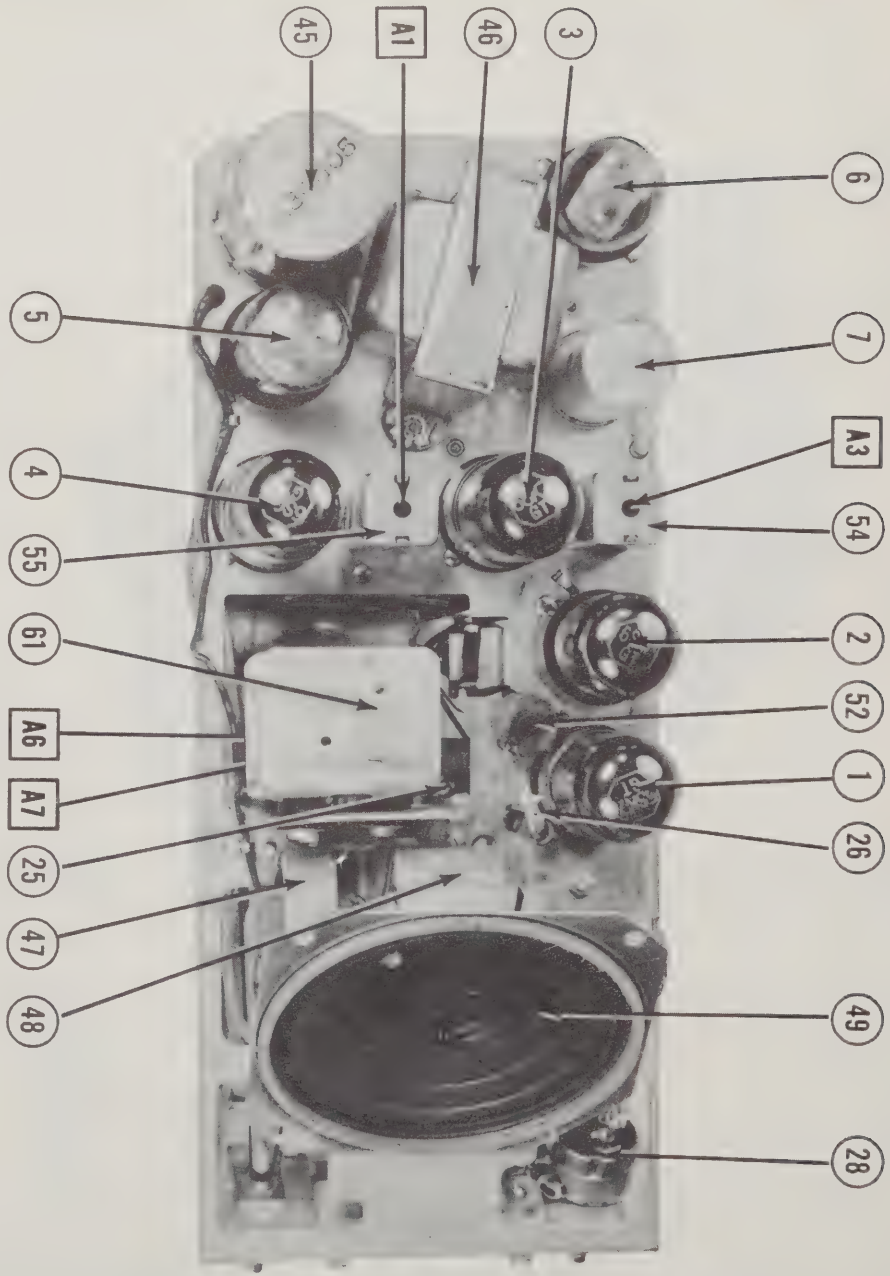
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
28	500KΩ	½	A24-176			Volume Control & Switch

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	IDENTIFICATION CODES
29	470Ω	½		BTS-470	Yl.-Vi.-Br. RF Cathode
30	22KΩ	½	A60-744	BTS-22K	Red-Red-Or. RF Plate Load
31	47KΩ	½	A60-685	BTS-47K	Yl.-Vi.-Or. Conv. Grid
32	2.2 Meg.	½	A60-726	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
33	22KΩ	½	A60-744	BTS-22K	Red-Red-Or. Oscillator Grid
34	220Ω	½	A60-753	BW-½-220	Red-Red-Br. IF Cathode
35	15KΩ	1	A60-716	BTA-15K	Br.-Grn.-Or. Screen Dropping
36	10 Meg.	½	A60-728	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
37	200KΩ	½	A60-667	BTS-220K	Red-Blk.-Yl. AF Plate Load
38	470KΩ	1	A60-731	BTA-470K	Yl.-Vi.-Yl. Output Grid
39	270Ω	1	A60-754	BW-1-270	Red-Vi.-Br. Output Cathode
40	10KΩ	1	A60-698	BTA-10K	Br.-Blk.-Or. Voltage Dropping
41	470Ω	1	A60-694	BTA-470	Yl.-Vi.-Br. Filter
42	100Ω	½	A60-752	BW-½-100	Br.-Blk.-Br. Hash Supp.
43	100Ω	½	A60-752	BW-½-100	Br.-Blk.-Br. " "
44	2.2 Meg.	½	A60-726	BTS-2.2 Meg.	Red-Red-Grn. AVC Network

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: RADIART PART No.	INSTALLATION NOTES
45	Interrupter	6.3V DC	115 ∿	A34-105	5301	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
46	6.3V DC @ 2.3A	380V CT @ .04A			B80-243			P-2970

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
47	5700Ω	3.5Ω	365Ω	.4Ω	B-80-242	A-3877‡	T22S46‡	A-2930‡	‡Bend mounting tabs down, file out slots and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-113‡		‡Fabricate new mounting bracket.
48	PM	3.5Ω	B79-362	Mod. P4-X	4A15‡	
	CONE DIA.	VC DIA.				
49	4"	9/16"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: MEISSNER PART No.
50	Ant. Loading Coil		.3Ω	A10-513	
51	Ant. Coil		4.5Ω	B10-511	
52	IF Trap Coil		51Ω	A10-510	
53	Osc. Coil		6.3Ω	A10-512	14-1060
54	Input IF	22Ω	21Ω	A10-508	16-6668
55	Output IF	18.7Ω	18.7Ω	A10-509	16-6669
56	Hash Choke		0Ω	A33-226	
57	Vib. Choke		0Ω	A33-228	

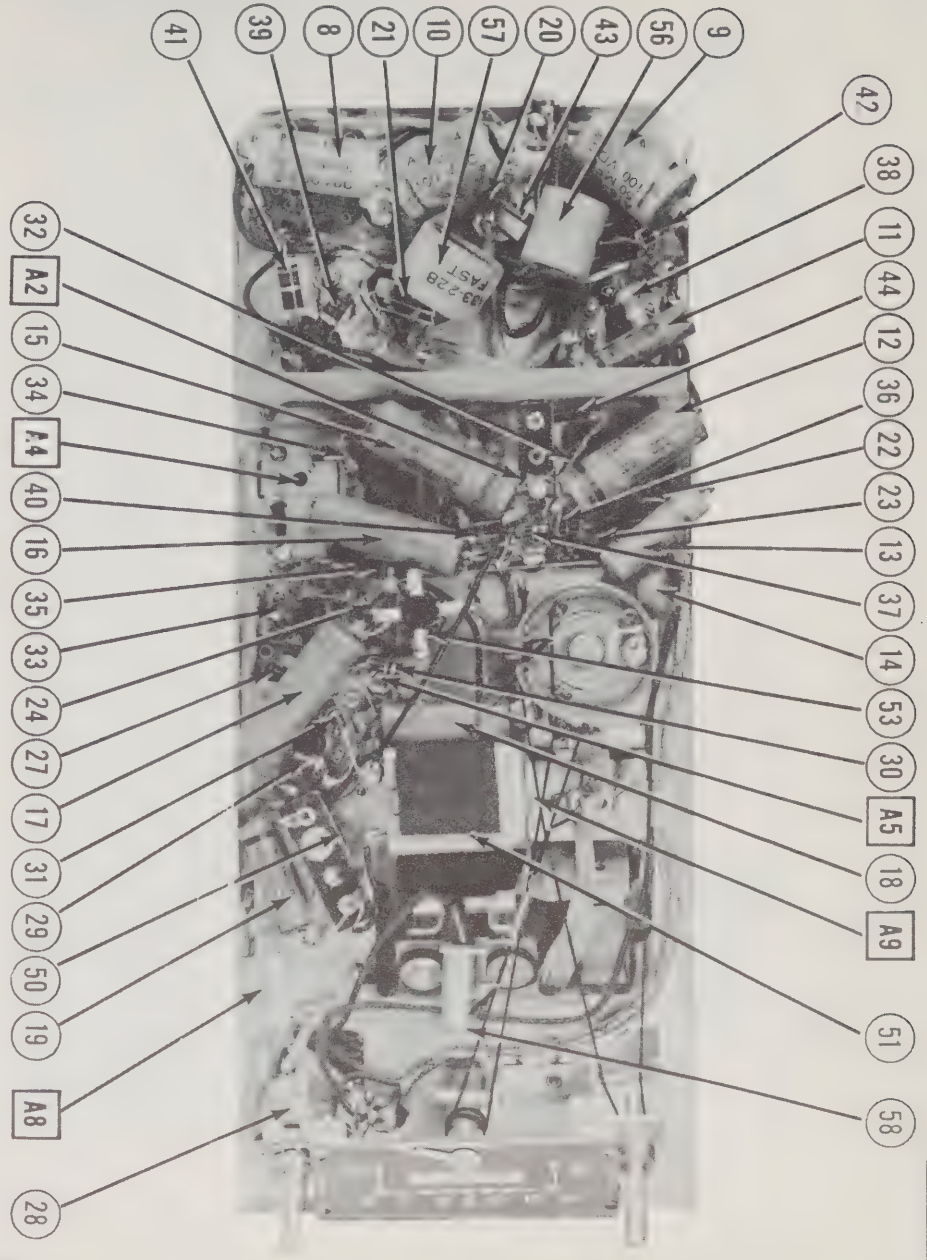
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
58	Bayonet	6-8	0.4	White			Type 55

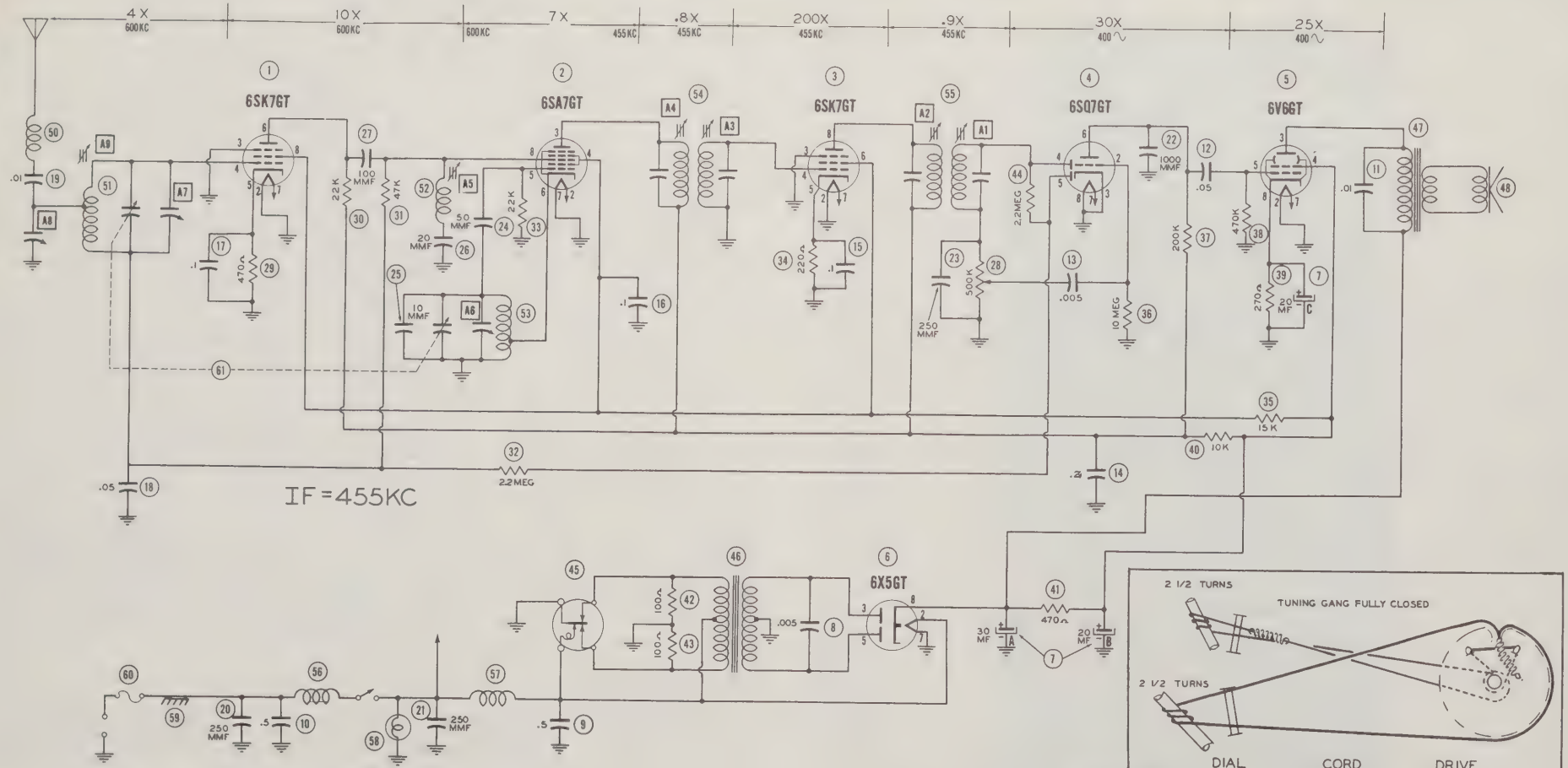
MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
59	Spark Plate		
60	Fuse	A43-10	15 Amp.
61	2 Gang Var. Cap.	B19-196	(13-450MMF, 13-178MMF)
A8	Padder	A20-145	Ant. Adj.
	Dial Crystal	A48-43	
	Dial Pointer	A58-55	
	Dial Scale	B67-516	
	Knob	A52-247	

CHASSIS—BOTTOM VIEW



DATE 9/48-#4815-26
SET #45-FOLDER #26
TRUETONE MODEL D4818



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7GT	0V.	0V.	0V.	-.1VDC	1.8VDC	55VDC	6.3VDC	85VDC
2	6SA7GT	0V.	6.3VDC	90VDC	55VDC	-8.6VDC	0V.	0V.	-.2VDC
3	6SK7GT	0V.	0V.	0V.	0V.	1.3VDC	55VDC	6.3VDC	90VDC
4	6SQ7GT	0V.	-.8VDC	0V.	-.8VDC	-.8VDC	80VDC	6.3VDC	0V.
5	6V6GT	0V.	0V.	175VDC	175VDC	0V.	175VDC	6.3VDC	7.6VDC
6	6X5GT	0V.	6.3VAC	190VAC	0V.	190VAC	0V.	0V.	185VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7GT	0Ω	0Ω	0Ω	5 Meg.	470Ω	145KΩ	.1Ω	160KΩ
2	6SA7GT	0Ω	.1Ω	140KΩ	150KΩ	22KΩ	.1Ω	0Ω	5 Meg.
3	6SK7GT	0Ω	0Ω	0Ω	21Ω	220Ω	145KΩ	.1Ω	140KΩ
4	6SQ7GT	0Ω	10 Meg.	0Ω	560KΩ	2.7 Meg.	360KΩ	.1Ω	0Ω
5	6V6GT	0Ω	0Ω	130KΩ	130KΩ	470KΩ	130KΩ	.1Ω	270Ω
6	6X5GT	0Ω	.1Ω	50Ω	0Ω	525Ω	0Ω	0Ω	130KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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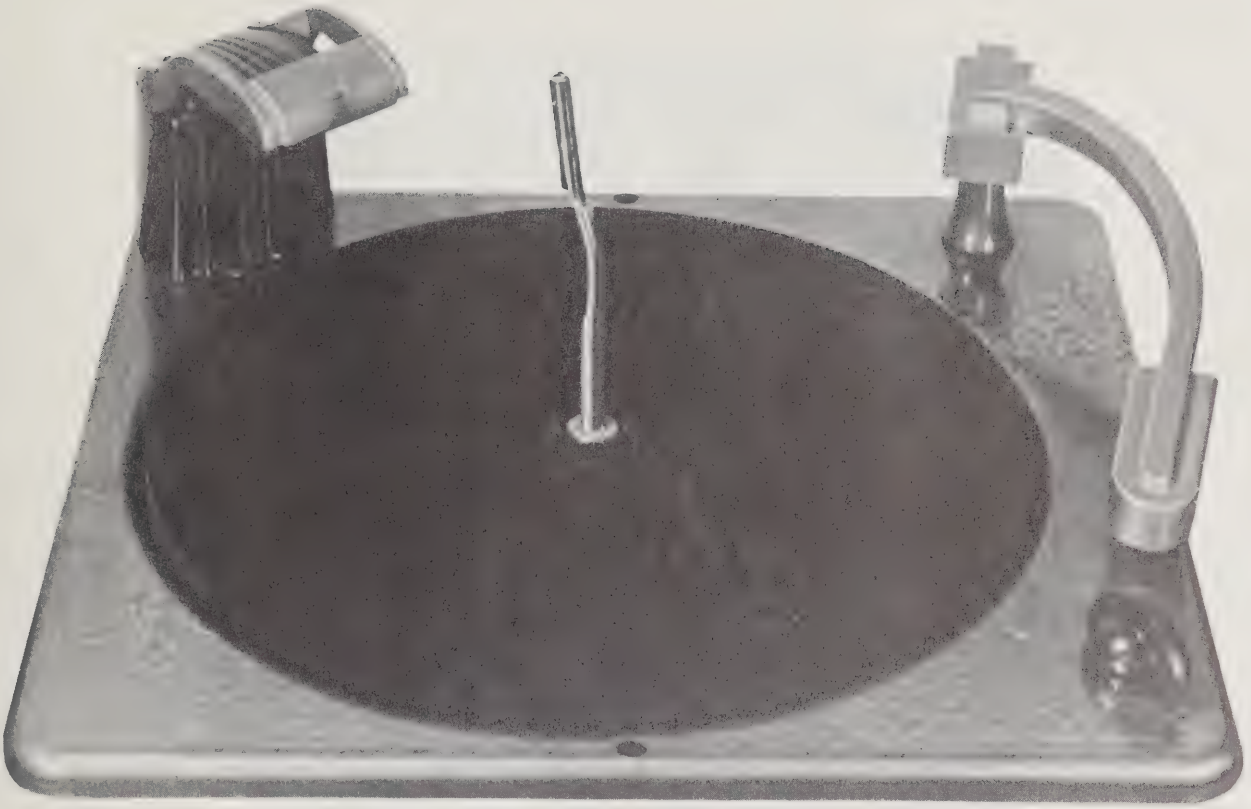
4815-26

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

GENERAL ELECTRIC
MODEL P6



TOP VIEW

GENERAL ELECTRIC
MODEL P6

GENERAL INFORMATION

The model P6 automatic record changer is a gearless and beltless mechanism designed to play automatically twelve 10-inch records or ten 12-inch records, not intermixed. The last record will be repeated until the changer is turned off. This changer is a single knob controlled mechanism, providing Off, Manual, Automatic, and Reject operation. Any record may be rejected, while playing, by turning the control knob to reject momentarily. Manual operation is provided for single records, home recordings, or odd-size records.

This changer is designed to operate from a power source of 105-125 volts at 60 cycles.

GENERAL ELECTRIC COMPANY
RECEIVER DIVISION ELECTRONICS PARK
SYRACUSE, NEW YORK, U.S.A.

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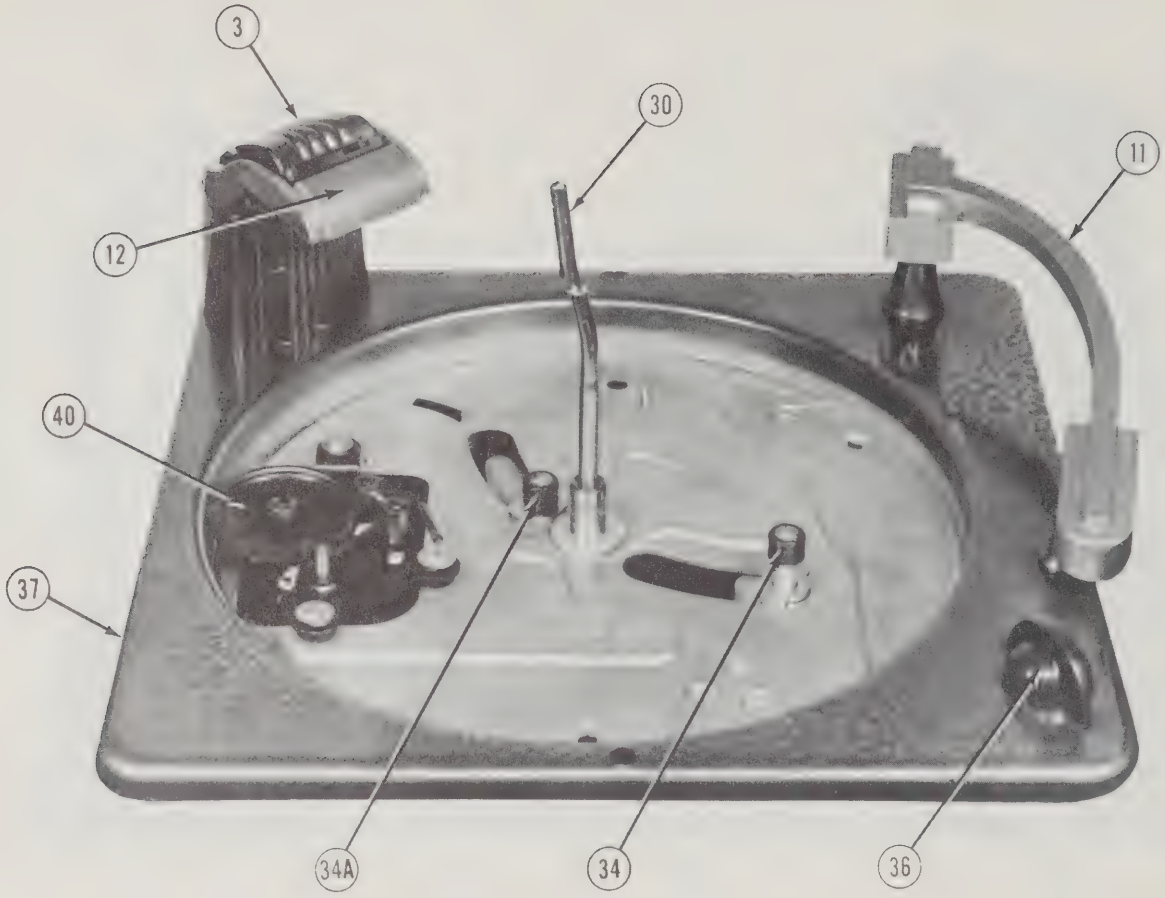
9/48-#4815-27 SET #45-FOLDER #27



TOP VIEW—LESS TURNTABLE

50-CYCLE OPERATION

To adapt this changer to 50-cycle operation from 60-cycle operation, it is necessary to do two things: (1) A dropping resistor of 70 ohms, part No. RRW-005, must be added in series with the motor power lead to prevent the motor from overheating; (2) at 50 cycles, a 60-cycle motor will run slower. Therefore, it is necessary to add a speed change bushing or spring to the rotor shaft of the motor. Two different types of motors were used on the P6 changer. The first type can be identified by the oblong type of laminated iron core (approximately 2½" x 2"), and the rotor end of the core is curved. This type uses 60 to 50-cycle speed change bushing, part No. RMS-151. The second type motor is identified by the square type of laminated iron core (approximately 2⅜" square) with rounded corners. This type uses a speed change bushing, part No. RMS-153.

AUTOMATIC OPERATION

1. Be sure the pickup arm (11) is on the pickup arm rest (35).

2. Raise the balance arm (1) to a vertical position.

3. For 10-inch records, lower the hinged 10-inch record support (3) to its rest position on the ejector box (9). For 12-inch records, raise the 10-inch record support to a vertical position.

4. Place a stack of records, not to exceed twelve 10-inch records or ten 12-inch records, not intermixed, over the center post. The records will now rest on the step on the center post and on either the ears of the ejector box or the ledge of the 10-inch record support, depending on the size of records being used and position of 10" record support.

5. Lower the balance arm (1) to the records; this steadies the records and assures correct dropping of records.

6. Turn the control button (36) momentarily to the "Reject" position and release it. This turns the changer on and starts the change cycle, thus dropping the first record to the turntable.

7. To reject a record being played, turn the control knob to "Reject" and release it.

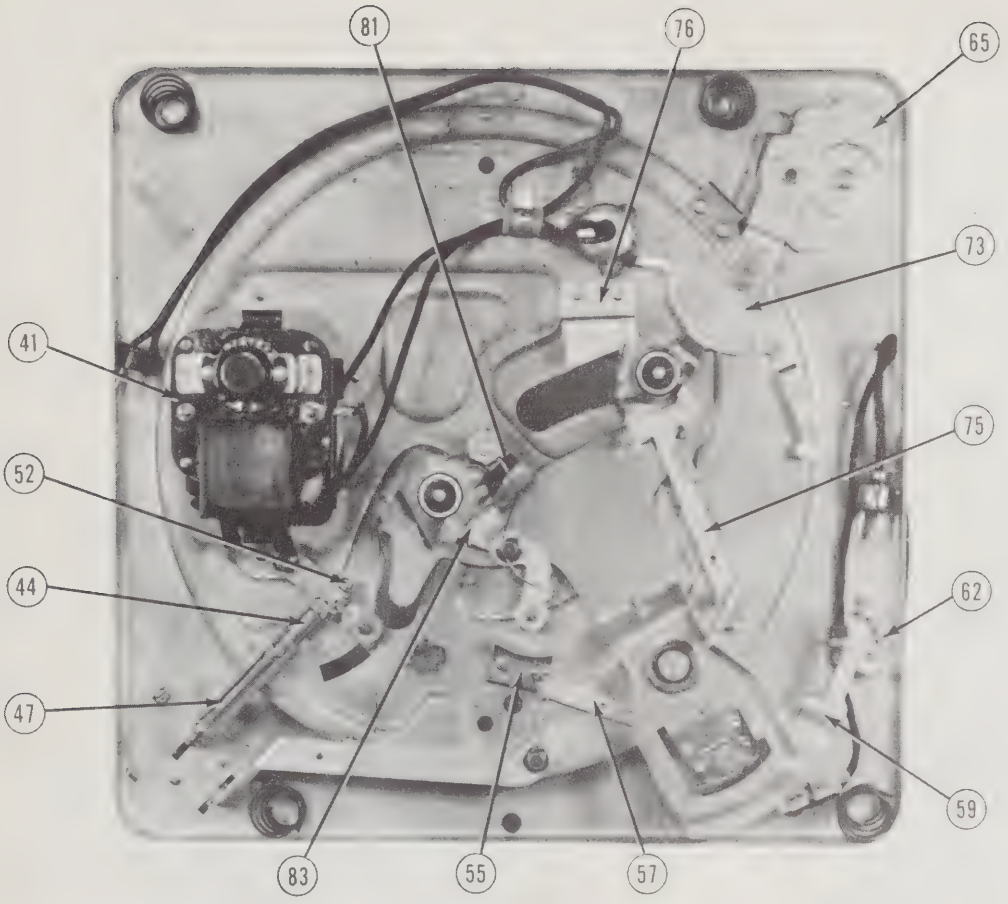
8. To discontinue operation, all records should be dropped to the turntable by repeatedly turning the control button to the Reject position until all unplayed records have dropped to the turntable. Place the pickup arm on the pickup arm rest and turn the control button to the "Off" position.

9. To remove the records from the turntable:
   (a) Raise the balance arm and the 10-inch record support upward, if the record support is in a horizontal position, to permit easy removal of records.
   (b) Lift the records from the turntable.

MANUAL OPERATION

1. Raise the balance arm (1) and the hinged 10-inch record support (3) to a vertical position.

2. Place a record on the turntable.



BOTTOM VIEW

3. Turn the control button to the "Manual" position. This action starts the rotation of the turntable. The position of the selector lever (73) blocks the movement of the lead bearing pin (34), thus preventing the changer from cycling.

4. Place the pickup arm on the lead-in groove at the edge of the record.

5. When the record has finished playing, return the pickup arm to the arm rest and turn the control button to the "Off" position.

THE CHANGE CYCLE

The change cycle may be started by turning the control button (36) to "Reject." The selector lever (73) then, being pivoted through the action of the notched washer, moves against the lead roller dropping lever (75), causing the flange of the dropping lever to be pivoted away from the top of the lead roller shoulder nut. This allows the lead roller bearing pin (34) to rise through the action of the compression spring (74) and to enter the spiral of the turntable, thus starting the change cycle.

As the lead roller of the swing arm follows the spiral on the underside of the turntable, the swing arm (64) cam engages the plunger pin (14), thus raising the pickup arm.

The ratchet arm friction spring (61) engages the ratchet arm (57), swinging the pickup arm out to a position where it is stopped by the ratchet arm contacting the stop bracket (91). The swing arm now pushes against the cam roller of the ejector idler lever (49), which, in turn, moves the lower push pin (44), the ejector lever (27), and the 12-inch record slide bolt (10), thus pushing a 12-inch record off the record shelf.

When 10-inch records are being played, the 12-inch record slide moves forward pushing the 10-inch record slide bolt (4), thus dropping a 10-inch to the turntable.

As the swing arm nears the end of its swing, the cammed dropping lever (83) comes in contact with the lever trip bracket (55), allowing the return roller pin (34A) to rise and enter the spiral groove.

The lead roller pin assembly is pushed back out of the spiral groove of the turntable by the cam surface at the center of the spiral and is held in position by the flange of the lead roller dropping lever (75). The swing arm is now moved back as the return roller follows the spiral.

The ejector assembly is now returned to its original position.

The pickup arm is moved back toward the record for set down by the friction springs (61). The pickup arm is stopped in proper position by the engagement of the ratchet arm (59) and the ratchet arm lever (57). The position of the ratchet arm lever is determined by the change lever (53) and the change lever ejector (29), which are operated by the 10-inch record support (4).

As the cycle nears completion, the swing arm contacts the brake spring (81), which prevents acceleration of the swing arm, thus assuring gentle lowering of the pickup arm to the record as the plunger pin rides down the cam of the swing arm. The friction springs (61) and the ratchet arm lever (57) are moved away from the ratchet arm through

A PHOTOFACT "EXPLODED" VIEW

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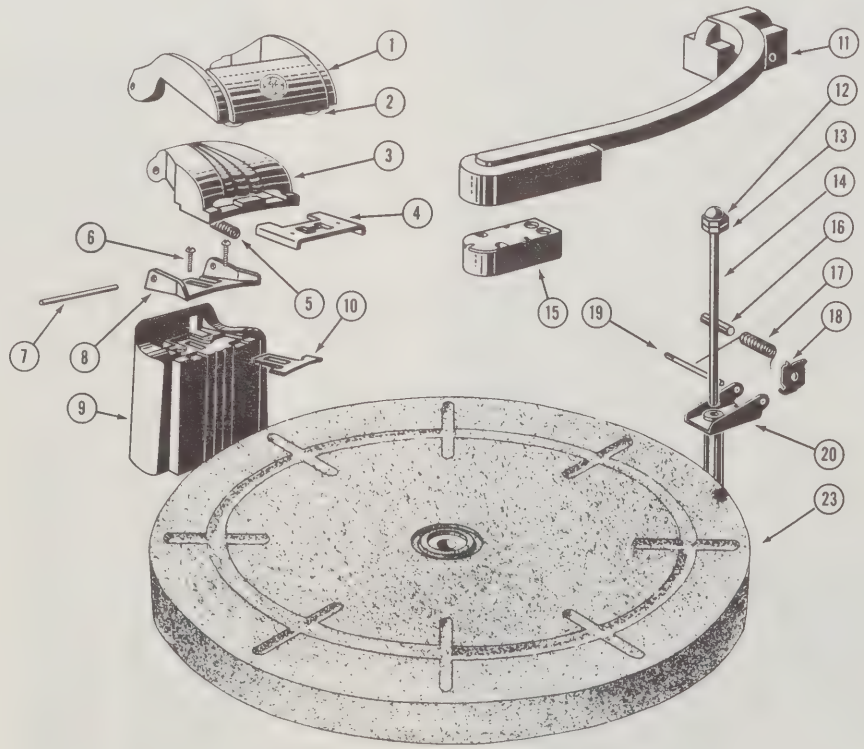

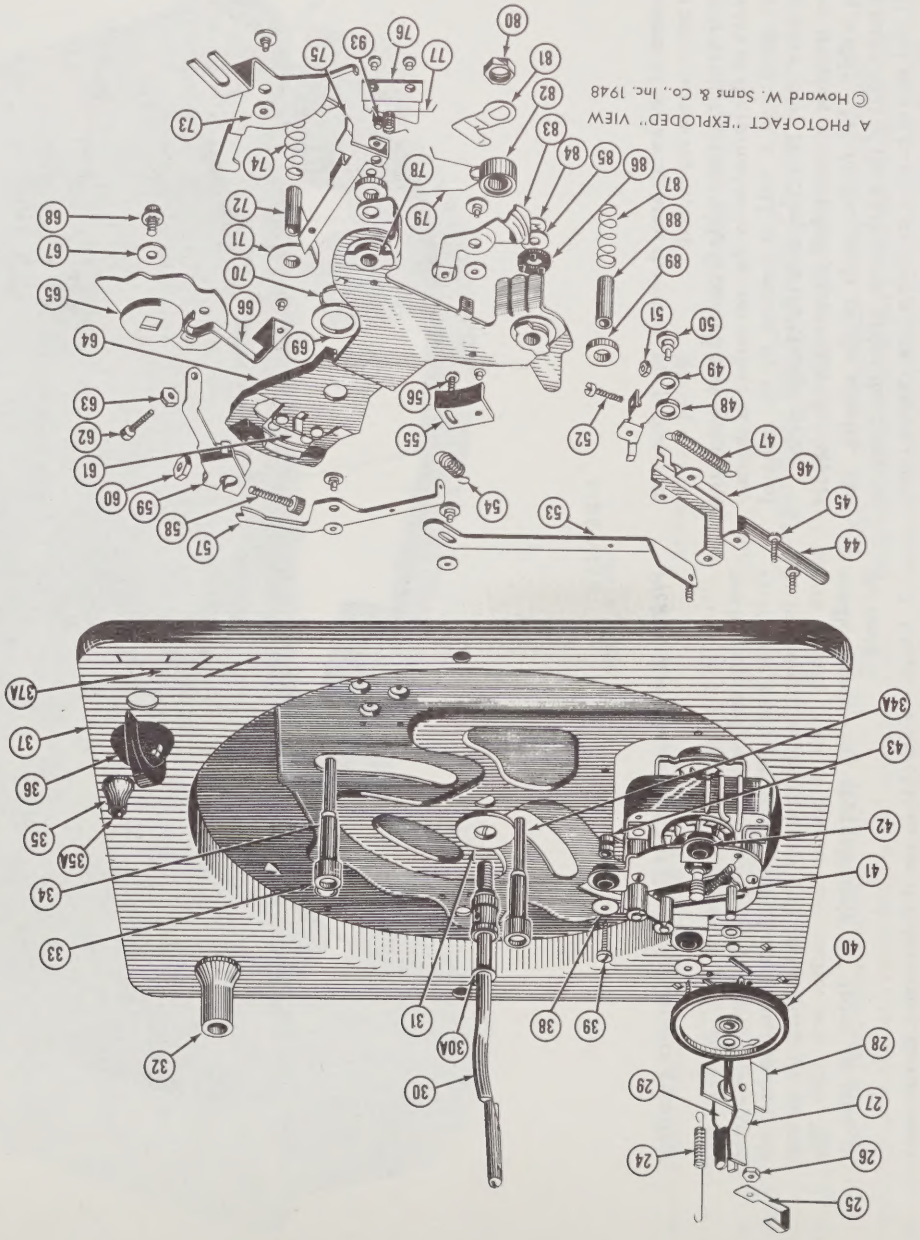
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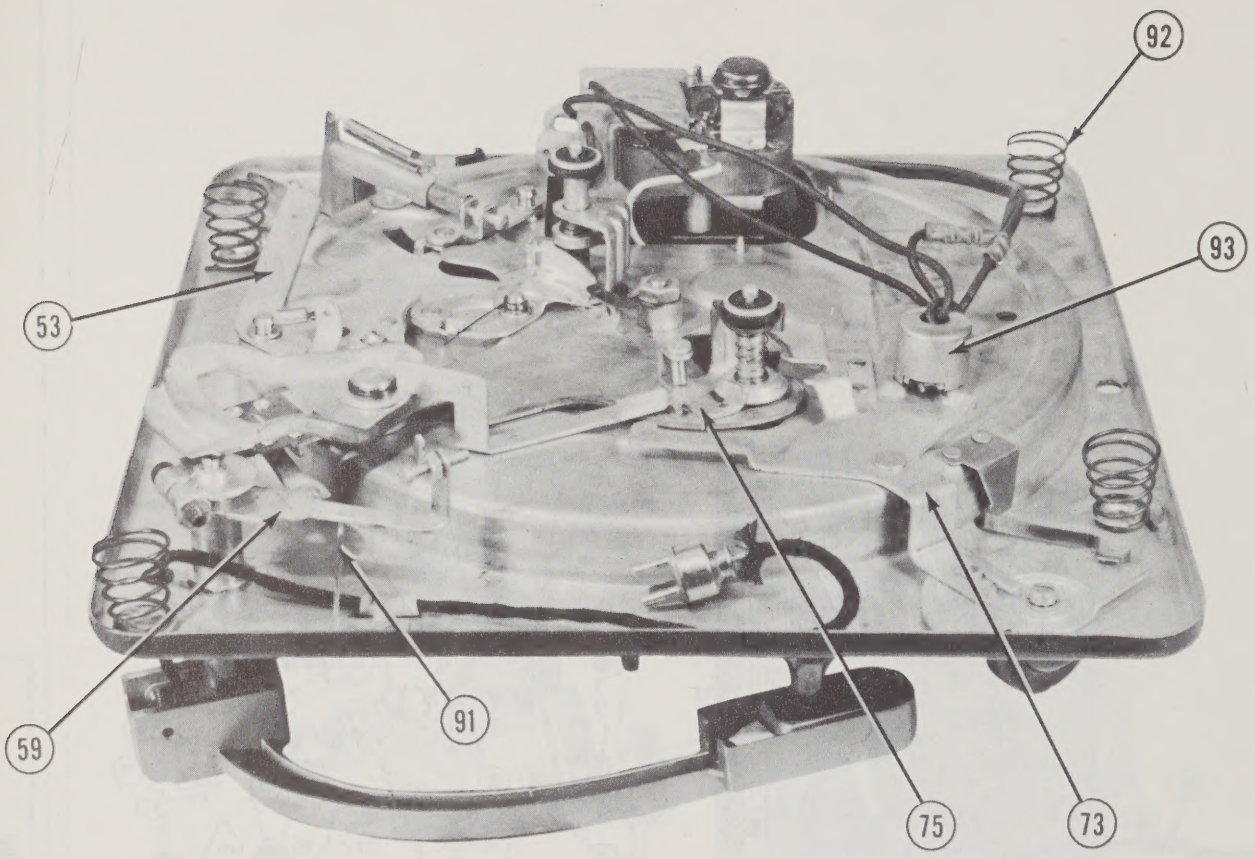


SIDE VIEW

the movement of the swing arm; therefore, the pickup arm is free to move across the record.

The return roller pin assembly is pushed back out of the spiral groove of the turntable by the cam surface at the center of the spiral, and is held in position by the cammed dropping lever (83). This completes the change cycle.

Positive tripping action takes place when the needle moves to within 1⅞" of the center of the spindle. The adjusting screw (62) of the ratchet arm strikes the dropping lever (75) and moves it, thus starting a new change cycle.

SERVICE PROCEDURES

Records Fail to Drop

1. Trip the changer and rotate the turntable by hand until the swing arm (64) completes the first half of the cycle:

(a) Adjust screw (52) until the 12-inch record slide bolt (10) extends 1/32" past the ears of the ejector box.

(b) If 12-inch records fail to drop to turntable, check the ejector arm extension spring (47) to see if it is loose or missing. If loose, or missing, the 12-inch record slide bolt (10) and the ejector lever (27) will stay in a forward position; thereby the ejector mechanism will not be actuated and the records will not be dropped to the turntable.

(c) If 10-inch records fail to drop to the turntable, check the 10-inch record support (3) to see if it is completely resting on the ears of the ejector box. Check to see if the ejector compression spring (5) is missing. If this spring is missing, the 10-inch record slide bolt (4) will stay in a forward position.

Pickup Arm Does Not Set Down in Correct Position

1. With the control knob turned to "Off" position, trip mechanism and rotate the turntable by hand through the cycle; note where the needle lands. Correction may be made by loosening the clamp screw (58) and moving the pickup arm slightly with respect to the ratchet arm (59). The needle should land approximately ⅛" from the edge of the record.

2. Check spring (54) to see if it is missing or too weak to actuate ratchet arm lever (57).

Pickup Arm Drops Fast When Setting Needle on Record

1. Check the friction brake spring (81); may be weak or broken.

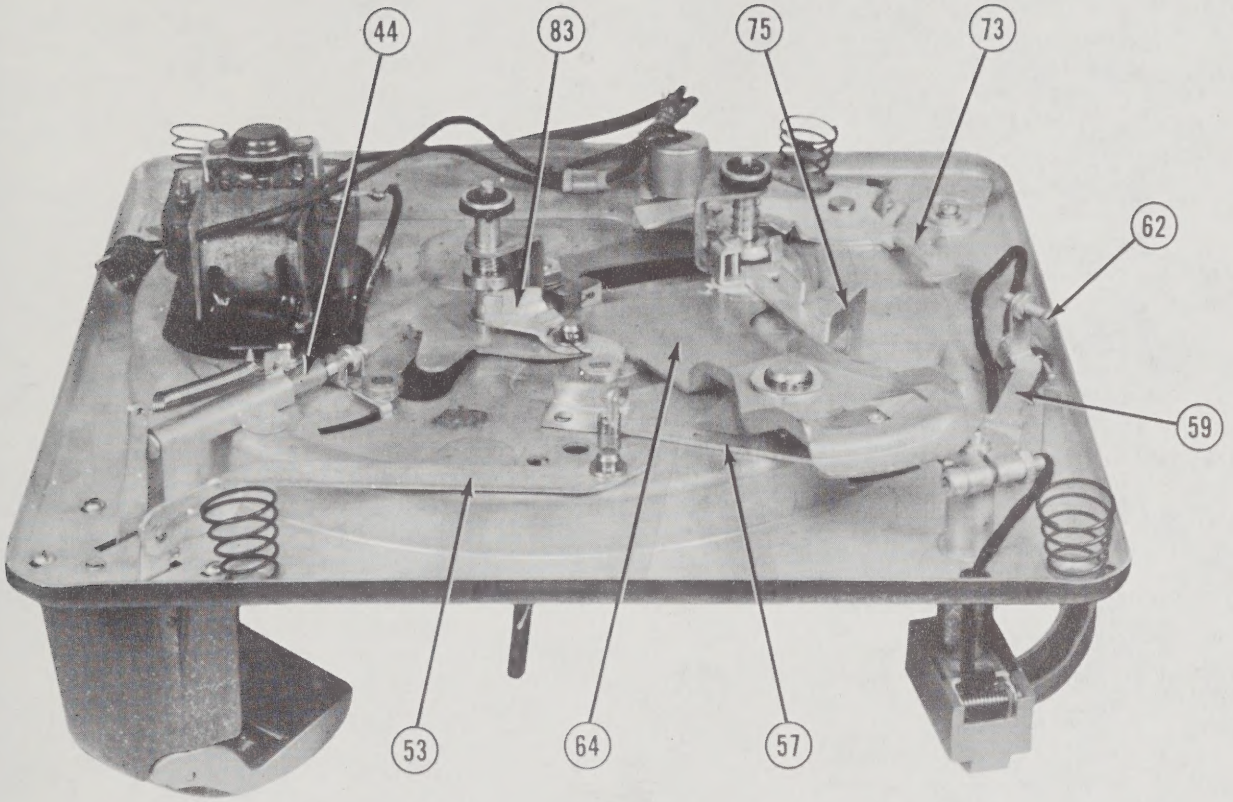
Pickup Arm Does Not Set Down on Record

1. The pickup arm height adjustment is made by the acorn nut (12) of the plunger pin (14).

2. Check the pickup lead wire to see if it is clear of the contact point of the pickup arm and the plunger pin.

Mechanism Trips Before Record Is Completed

1. Turn the adjusting screw (62) of the ratchet arm (59) counterclockwise. This adjustment will allow the pickup arm to travel nearer the spindle.



REAR VIEW

Mechanism Fails to Trip at End of Record

1. Check adjusting screw (62) to see if it is making contact with the lead roller dropping lever (75). This screw should be adjusted so that when the pickup arm comes within 1⅞" of the center of the record the mechanism will be tripped.

2. Check the compression spring (74). It may be too weak to actuate the lead roller bearing pin assembly, and may not raise it sufficiently to enter the spiral of the turntable. If this is true, the mechanism will not operate when the control button is turned to Reject.

3. If pickup arm jumps groove in record before tripping, check for tightening of drop lever (75) on washer (71).

Mechanism Jams in Second Half of Change Cycle

1. Check dropping lever torsion spring (77) to see if it is loose or missing. If this spring is not connected, the dropping lever will not be actuated, thus not holding the roller pin (34) down when it is pushed down by the cam surface at the center of the spiral of the turntable. This allows both rollers in the spiral at the same time, thereby jamming the mechanism.

Clicking of Mechanism and Jamming at the Start of the Change Cycle

1. Check the cammed dropping lever torsion spring (79) to see if it is loose or broken. This will allow both bearing pins to stay in a raised position.

Continuous Cycling

1. Check the selector lever spring (66) to see if it is broken or bent.

Changer Does Not Complete Change Cycle But Turntable Continues to Rotate

1. Check the compression spring (87). If spring is too weak to raise the bearing pin (34A), the swing arm will not return to its proper position, thus leaving the pickup arm in an outward and raised position.

LUBRICATION

Use Lubriplate or equivalent on the following:

1. The ten-inch ejector slide plate (4) and the twelve-inch ejector slide plate (10).
2. Lead roller shoulder nut.

Use Millicott 70K or equivalent on the following:

1. On the edges of the slots where the swing arm clamps (78), slide on the mounting plate.
2. Sloping edge of the cammed dropping lever assembly (83).
3. Between the friction spring washer (30A) and the spindle.
4. Lever bearing washer (48).
5. Ejector idler lever pivot pin (49).
6. Cammed dropping lever roller and pivot pin (83).
7. Ratchet arm lever pivot pin (57).
8. Lead roller drop lever pivot pin (75).
9. Change lever fulcrum pin and slide washer (53).

PARTS LIST

Ref. No.	Part No.	Description
1	RMA-003	Balance arm assembly (Including Item 2)
2		Rubber Bumpers
3	RMM-062	10-inch Record Support
4	RMM-069	10-inch Record Slide Bolt
5	RMS-131	Ejector Compression Spring
6		4-40 x 3/8" R.H. Machine Screw
7	RMP-012	Hinge Pin
8	RMM	Slide Bolt Cover
9	RME	Ejector Box
10	RMM-071	12-Inch Record Slide Bolt
11	RPA-005	Pickup Arm
12		Acorn Nut for Pickup Arm Plunger Pin
13		10-32 Bearing Pin Jam Nut
14	RMP-013	Adjusting Plunger Pin
15	RPX-010	Variable Reluctance Pickup
16	RMM-068	Balance Spring Tube
17	RMS-132	Pickup Arm Balance Spring
18	RMR-006	Pickup Arm Ratchet
19	RMP-014	Pivot Yoke Pin
20	RMP-015	Pickup Arm Swing Post Sub-Assembly
23	RMT-013	Turntable
24	RMS-133	Balance Arm Spring
25	RMS-134	Ejector Pressure Spring
26		4-40 Hex Nut
27		Ejector Lever (Part of Item 28)
28	RMX-111	Ejector Pivot Channel Sub-Assembly (Including Items 27 and 29)
29		Change Lever (Part of Item 28)
30	RMV-040	Center Post Assembly
30A	RMS-135	Friction Spring Washer
31	RMM-063	Reenforcement Washer
32		Pickup Arm Mounting Post (Part of Item 37)
33		Roller (Part of Items 34 and 34A)
34	RMB-014	Bearing Pin and Roller (Lead Roller)
34A	RMB-014	Bearing Pin and Roller (Return Roller)
35		Pickup Arm Rest (Part of 37)
35A		Arm Rest Bumper (Part of 37)
36	RDK-128	Control Knob
37		Baseplate (Including Items 32, 35, and 46)
37A		Decal
38		Flat Washer
39		6 x 5/8 S.M. Motor Mounting Screw
40	RMW-029	Idler Wheel for Square Core Type Motor (See 50-Cycle Operation)
	RMW-043	Idler Wheel for Oblong Core Type Motor (See 50-Cycle Operation)
	RMS-151	50-Cycle Conversion Spring for Oblong Core Type Motor (See 50-Cycle Operation)
	RMS-152	Idler Wheel Tension Spring for Oblong Core Type Motor (See 50-Cycle Operation)
	RMS-153	Conversion Spring for Square Core Type Motor (See 50-Cycle Operation)
	RMS-081	Idler Wheel Tension Spring for Motor with Black Idler Wheel and Square Laminated Core
41	RBH-008	Phonomotor
42		Motor Mounting Grommet
43		Motor Mounting Spacers

Ref. No.	Part No.	Description
44		Lower Push Pin
45		6-32 x 3/8 Thd. Cutting Machine Screw
46		Ejector Pin Guide (Part of Item 37)
47	RMS-136	Ejector Arm Extension Spring
48	RMM-064	Lever Bearing Washer
49	RMX-112	Ejector Idler Lever Assembly (Including Items 51 and 52)
50	RMP-016	Lever Fulcrum Pin
51		Lock Nut (Part of Item 49)
52		6-32 x 5/8" Adjusting Screw (Part of Item 53)
53	RMM-072	Change Lever
	RMM-076	Slide Washer
	RMM-077	Lever Fulcrum Pin
54	RMS-137	Ratchet Arm Lever Spring
55		Lever Trip Bracket
56		6-32 x 3/8" Thd. Cutting Machine Screw
57	RMM-073	Ratchet Arm Lever Fulcrum Pin
58		1" x 10-32 Socket Head Cap Screw
59	RMX-113	Ratchet Arm
60		10-32 Hex Nut
61	RMS-138	Ratchet Arm Friction Spring
62		5/8" x 6-32 Fillister Hd. Machine Screw
63		6-32 Hex Nut
64	RMA-004	Swing Arm
65		Notched Washer
66	RMS-146	Selector Lever Spring
67		Fulcrum Bearing Washer
68		10-32 x 3/8" Sems Screw
69		33/64" I.D. x 7/8" O.D. x .060" Flat Washer
70	RMS-139	XSC Retaining Ring
71	RMM-065	Lead Roller Shoulder Nut
72	RMM-066	Bearing Pin Spacer
73	RMM-074	Selector Lever
74	RMS-140	Compression Spring
75	RMM-075	Lead Roller Drop Lever
76		Lead Roller Release
77	RMS-141	Drop Lever Torsion Spring
78		Swing Arm Clamp
79	RMS-142	Cammed Dropping Lever Torsion Spring
80		5/16"-24 Center Stud Jam Nut
81	RMS-143	Friction Brake Spring
82		Spacer Collar for Center Post
83	RMX-114	Cammed Dropping Lever Assembly
84	RHM-044	Roller Bearing Speed Nut
85		Fulcrum Bearing Washer
86	RHM-045	Rubber Grommet Cushion
87	RMS-140	Compression Spring
88	RMM-066	Bearing Pin Spacer
89	RMM-067	Bearing Pin Shoulder Nut
90		Grommet for Pickup Leads
91		Ratchet Arm Stop Bracket
92	RMS-144	Mounting Springs
93	RSW-052	Phonomotor Switch
	RRW-005	70-Ohm Wire-Wound Dropping Resistor for 50-Cycle Operation of Phonomotor